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ABSTRACT

This report addresses small and medium-sized enterprises' (SMEs') role in the changing international division of labor and trade in information service activities. Chapter 2 describes the EMERGENCE project to map and measure eWork. Chapter 3 reviews literature that shows SMEs account for the overwhelming majority of companies and make a crucial contribution to total employment and highlights their strengths and weaknesses. Chapter 4 derives 10 hypotheses about SMEs in the new economy and trade in information activities. Chapter 5 describes the large-scale survey of employers in 15 European Union countries and 3 accession states to provide empirical data. Chapter 6 on eWork and demand for information activities reports that establishment size has a significant impact on frequency of observing eWork; eOutsourcing is the most popular form of eWork; and, in the knowledge sector, size does not significantly impact on frequency of practicing eWork. Chapter 7 reports on the supply side of eWork, including that SMEs in the knowledge sector are more important suppliers of telemediated services than large enterprises, and small ones are more often chosen due to expertise and cost advantages. Using bivariate and logistic regression analyses, Chapter 8 shows that the impact of establishment size on eWork and eSupply is subordinate to the impact of sector and country. Chapter 9 presents illustrative case study fragments. Chapter 10 makes conclusions about threats and opportunities for SMEs in the new economy. Appendixes

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Is Small Finally Becoming Beautiful?

Small and medium-size enterprises in the new economy

J Dejonckheere, M Ramioul, G Van Hootegem

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Hoger instituut voor de arbeid

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Executive Summary

Information and communication technologies (ICTs) have facilitated many changes in the concrete organisation and location of business activities such as software development, data processing and customer services. Activities involving the processing of information and their transmission by means of telecommunications have become less tied to a particular location. They can be located anywhere in the world where the appropriate infrastructure exists and where workers are to be found with the right skills. This is a phenomenon which has come to be described as 'eWork'.

But to what extent are small companies actually making use of eWork and the potential to relocate information activities? Are SMEs (Small and Medium-sized Enterprises) practising eWork as frequently as – or even more often than – big companies? Or are they unable to cope with the technological revolution and the challenges of globalisation? And what about the supply side of the trade in information activities? Are SMEs attractive suppliers of remote information work to bigger companies? What are the comparative advantages and disadvantages of SMEs compared to large corporations?

These are some of the questions addressed in this report, which in general is dealing with the role of SMEs in the new economy, in the changing international division of labour and the trade in information service activities.

SMEs in general

Because of the lack of a uniform, globally accepted definition of an SME, we had to construct our own definition. In the EMERGENCE project, an SME has been defined as a company employing up to 200 employees.

SMEs account for the overwhelming majority of all companies and make a very crucial contribution to total employment. In the course of the years, the position of SMEs has become more important because of a number of interrelated factors such as the tertiarisation of the economy, increased downsizing of big companies, increased outsourcing in more transparent markets characterised by lower interaction costs, the dysfunctions of

traditional large companies and virtues of small companies in a rapidly changing economic environment.

Typical weaknesses of SMEs are, among others, limited financial resources, a low degree of professionalism, difficulties in recruiting qualified staff and skilled workers, and the absence of economies of scale. Typical strengths, on the other hand, include flexibility, adaptability, speed of decision-making as well as a simple and flexible organisation structure.

SMEs in the new economy: empirical data from EMERGENCE

This report mainly presents the results of a large-scale international survey of employers by means of computer-aided telephone interviews. In the course of the year 2000, 7,268 establishments with 50 or more employees were surveyed in the 15 EU countries, as well as three EU Accession States (Hungary, Poland and the Czech Republic). The decision to raise the minimum size threshold to establishments with a minimum of 50 employees is not only due to budgetary constraints. Although it was recognised that very small establishments in the knowledge sector, such as design or software companies, might play a significant role in the supply of eWork, it was also recognised that this size category also includes a very large number of small firms in sectors such as artisanal manufacture, agriculture, retail, catering and miscellaneous services which have very little to do with the supply of eServices. A random survey in this size category, it was felt, would throw up a very high proportion of cases with little or no relevance to the survey and it was therefore decided that a different approach should be adopted in this size category.

This approach consisted of undertaking supplementary surveys of establishments with fewer than 50 employees in several countries using the same methodology, but limited only to those sectors that are likely to be involved in the supply of services, categorised as the 'knowledge sector'. So far, supplementary surveys in the knowledge sector have been executed in Denmark (n = 108) and Ireland (n = 100). The results of surveys of these so-called micro-firms (less than 50 employees) have been added to and compared with the overall EMERGENCE survey findings, containing data from small (50 to 100 employees), medium-sized (100 to 200 employees) and large establishments (greater than 200 employees).

The EMERGENCE survey captures data on both the demand and supply side of the trade in eWork. The demand side refers to companies having a clear need or demand for telemediated work for their own functioning. This demand for eWork can either be fulfilled by means of in-house solutions, or by means of outsourcing using a telecommunications link to import business services (*cf.* typology of eWork). Every outsourcing relationship,

Figure 1: Typology of eWork

Type of workplace	Contractual: Internal/employees	Contractual: Outsourced
Individualised (away from 'office' premises)	Employed tele-homeWorkers Mobile employees	Freelance eWorkers or mobile workers (= eLancers)
Collective (on shared 'office' premises)	Remote back offices/call centres Employees working in telecottages or other third party premises	Specialist business service supply companies Outsourced call centres (= eService suppliers)

Source: Huws U, O'Regan S (2001)

of course, involves two parties. The supply side of eWork refers to 'the other side' of an outsourcing relationship, *ie* companies or freelancers supplying telemediated information activities to third party companies, their business clients. In Figure 1, we present some key results of respectively the demand side and the supply side of eWork.

eWork and the demand for information activities

- In general, the size of an establishment impacts on the frequency of observing eWork in a significant and straightforward way: small establishments practice eWork somewhat less often than medium-sized and markedly less than large establishments.
- This is all the more the case for establishments not belonging to the knowledge sector. Within the knowledge sector, the size of an establishment does not play such an important role. In other words, the group of companies commonly categorised as SMEs is a very heterogeneous one.
- Regardless of the size of establishments, the largest proportion of eWork involves outsourcing. In relative terms, though, small establishments make considerable use of in-house forms of eWork.
- Regardless of the size of establishments, the largest proportion of eWork involves groups of workers on shared premises. In relative terms, though, small establishments make considerable use of individualised form of eWork.
- Regardless of the size of establishments, eOutsourcing to companies is the most popular form eWork followed, at a safe distance, by making use of so-called eLancers and mobile teleworkers, whereas the use of home-based teleworkers and telecottages is far from widespread. Relative to big establishments, small ones are considerably less likely to make use of eOutsourcing to third party companies.

- Establishments in the knowledge sector practice eWork more often than other establishments. They do not outsource information work to third party companies more often, but they make far more use of eLancers and all types of eEmployees.
- Within the knowledge sector, size does not significantly impact on the frequency of practising any kind of eWork – insofar as establishments employ over 50 employees.
- Micro-firms (<50 employees) in the Irish and Danish knowledge sector seem to perform particularly well in the field of employing home-based teleworkers and in the case of Ireland, also eOutsourcing to freelancers. On the other hand, they make less use of mobile teleworkers and back offices than their counterparts employing more than 50 employees.
- Regardless of the size of establishments, relocations within the region are far more popular than relocations to another region, let alone to another country. In relative terms, the geographical scope of eWork relocation is somewhat smaller in small as opposed to large establishments.
- The size of establishments does not impact on the reasons for choosing a remote location and/or eService supplier that much – technical expertise being the overall number one reason. Informal contacts and networking play an especially important role in the decision-making processes of small establishments.

The supply side of eWork and the trade in information activities

- In general, the size of establishments does not impact significantly on the telemediated supply of information-based services; small establishments do not score better than large ones in the field of eSupply, but they do not score worse either.
- This contrasts strongly with the demand for eWork, where large establishments outperform small ones. Consequently, in relative terms, SMEs are more important on the supply side of the trade in information activities than on the demand side.
- This is all the more the case when limiting ourselves to the knowledge sector. SMEs in the knowledge sector are very important suppliers of telemediated services, more important than large establishments in the knowledge sector.
- The importance of SMEs on the supply side of outsourcing relationships is further confirmed by analysing the average number of workers involved at the remote location in cases of outsourcing. The data seem to underline the importance of individual entrepreneurs and micro-businesses in the supply of eServices.

- Regardless of the size of establishments, the business function most likely to be supplied by means of ICT is customer service, followed by creative work and software development.
- Establishments in the knowledge sector outperform other establishments in the field of eSupply and this is the case for all business functions under investigation.
- Small establishments in the knowledge sector are most active in the field of supplying software development and support, and creative work.
- Regardless of the size of establishments, information services are most frequently supplied to companies in the same region and least frequently to companies abroad. In relative terms, the geographical scope of eSupply is somewhat smaller in small as opposed to large establishments.
- Overall, the size of establishments does not impact very much on the reasons for being chosen as an eSupplier. Compared to larger establishments, small ones are more often chosen because of their expertise and cost advantages, and to a lesser extent also because of informal contacts.
- Micro-firms (<50 employees) in the Danish and Irish knowledge sector have succeeded in capturing important segments of the market in remote information services. Supplementary surveys in other countries will allow us to answer the question whether these findings, proving the importance of very small knowledge firms on the supply side of the new economy, can be generalised.

How important is establishment size?

The number of employees is clearly not the only factor impacting on the frequency of observing the different types of eWork as well as eSupply. Bivariate analyses reveal considerable country and sector differences. Moreover, they seem to suggest that the influence of establishment size is smaller than the one of sector and country. This assumption is confirmed by logistic regression analysis, which separates out the interrelated effects of the explanatory variables country, sector and size. Logistic regression does indeed show that the impact of establishment size on the different types of eWork as well as on eSupply is subordinate to the impact of sector, and certainly to the impact of country. Several factors might contribute to this.

First, the observation that the number of employees does not differentiate eWork and eSupply practices as much as sector and country, is likely to be influenced by that fact that very small firms have been excluded from the overall EMERGENCE survey. Supplementary surveys in very small firms will allow us to answer the question whether the finding can be generalised or not.

Second, rather than suggesting a common European model of eWork practice, the empirical data reveal a considerable degree of national and regional diversity within Europe. This is certainly not an isolated observation. Other international employer surveys, as well as the global statistical analysis conducted at the beginning of the EMERGENCE project, support the idea of regional diversity instead of regional convergence within the European information society.

A final factor refers to the enormous heterogeneity of the group of SMEs. Irrespective of the sector or economic activity, SMEs can, among others, consist of startup companies, subsidiaries of large companies, small companies that are likely to remain SMEs for ever, rapidly growing companies that are likely to exceed the 'SME threshold' in due course, formerly large companies that have become SMEs after downsizing or outsourcing *etc.* eWork practices are likely to differ according to the type of SME, but a lot of these differences bear the risk of being averaged out when grouping this enormous variety under one common denominator. In line with this idea of heterogeneity, the EMERGENCE case studies in which SMEs are involved show a rich variety of different eWork and relocation practices.

Conclusions

In general, the empirical data from EMERGENCE support the idea of the knowledge sector as an important cornerstone of the new economy, characterised by a very dynamic use of eWork and trade in telemediated business services. Small knowledge establishments and micro-firms appear to be increasingly important, especially on the supply side of eWork. SMEs have clearly succeeded in capturing very important segments of the market in remote business services, especially software development and support, and creative work – a category that includes design, editorial work, multimedia content generation and other creative activities such as R & D.

The crucial role knowledge-intensive SMEs play in the new economy has not taken us by surprise. We expected a significant part of eServices to be delivered by SMEs, mainly (1) because increased outsourcing of information activities is resulting in new business opportunities for SMEs specialising in these fields; (2) because of the low degree of capital intensity of many eBusinesses resulting in relative low startup and exploitation costs – in this way, a traditional weakness of SMEs is becoming less important in the new economy; (3) because flexibility, adaptability, speed of decision-making and innovativeness – traditional strengths of SMEs – appear to be all the more important for the supply of knowledge intensive business services; and (4) because electronic networking and clustering allows SMEs to combine the advantages of small scale with various of the benefits of large scale.

In essence, typical weaknesses of SMEs are becoming less important in the new economy, or they can be mitigated, for example, by means of networking, whereas typical strengths can increasingly be cashed in. On the basis of literature survey as well as the empirical results from EMERGENCE, we can therefore conclude that 'small *is* finally becoming beautiful'.

In fact, it might be better to conclude that 'small *can* finally become beautiful'. The literature survey, EMERGENCE data analysis and case studies also show that the group of companies commonly categorised as SMEs is an extremely heterogeneous one. Whereas a minority of SMEs indeed specialise in the supply of knowledge intensive business services, the majority still operate in a medium to low technology environment. Many SMEs do not work their way through the electronic highway that easily and might not be able to cope with the technological revolution and challenges of globalisation. It is therefore crucially important to gain a better insight into the barriers many SMEs face to make better use of the eService patrimony. If these barriers are not adequately mapped and counteracted by policy, there is a risk of further economic polarisation in which the available government incentives benefit only a small number of economic actors.

A second nuance relates to the relativity of the size of establishments. The number of employees is clearly not the only factor impacting on the likelihood of an establishment to practice eWork or to be involved in the remote supply of telemediated business services. The prevalence of different types of eWork and eSupply is subject to considerable sectoral and country differences. In fact, when compared with the size variable, the economic sector has a more important influence on the prevalence of eWork and the telemediated supply of information work. This is all the more the case for the country under investigation, the most important independent variable. Rather than suggesting a common European model of eWork practice, the empirical data gathered in the project reveal a considerable degree of national and regional diversity within Europe. In other words, there appears to be considerable sectoral and regional variance in 'the beauty of being small'.

1. Introduction

Information and Communication Technologies (ICTs) have facilitated many changes in the concrete organisation and location of business activities such as software development, data processing and customer services. Activities involving the processing of information and their transmission by means of telecommunications have become less tied to a particular location. They can be located anywhere in the world where the appropriate infrastructure exists and where workers are to be found with the right skills. This is a phenomenon which has come to be described as 'eWork' (Huws and O'Regan, 2001).

But to what extent are small companies actually making use of eWork and the potential to relocate information activities? Are SMEs (Small and Medium-sized Enterprises) practising eWork as frequently as – or even more often than – big companies? Or are they unable to cope with the technological revolution and the challenges of globalisation? And what about the supply side of the trade in information activities? Are SMEs attractive suppliers of remote information work to bigger companies? What are the comparative advantages and disadvantages of SMEs compared to large corporations?

These are some of the questions addressed in this report, which in general is dealing with the role of SMEs in the new economy, in the changing international division of labour and the trade in information service activities.

The report is based on a number of hypotheses on the position of SMEs in the new economy, derived from a literature survey. A focused analysis of the empirical findings from the EMERGENCE project will allow us to test these hypotheses and to fine-tune the specificity of SMEs in the new economy, including facilitators and barriers, threats and opportunities. Before reviewing some literature (Chapter 3) and deriving our working hypotheses (Chapter 4), we elaborate a little further on the research project underpinning this report (Chapter 2).

2. The EMERGENCE Project

Questions on the relocation of eWork and trade in information activities are extremely difficult to answer using existing information. Designed for collecting information on employment which is anchored to a single spot and for tracking the physical movements of 'real' goods, most existing statistics are unsuitable for monitoring the elusive flows of electronically-transmitted services such as, for example, software development, data processing and customer services. Therefore, the EMERGENCE[1] project was set up with funding from the European Commission's Information Society Technologies (IST) programme to map and measure eWork.

2.1 Conceptual framework[2]

In the EMERGENCE project, eWork has been defined as 'any information work that is carried out away from an establishment and managed from that establishment using information technology and a telecommunications link for receipt or delivery of the work'. The conceptual framework developed for classifying the various forms of eWork involves drawing two broad distinctions.

The first of these is a legal distinction: between work carried out internally (*ie* by people contracted to work directly for the respondent organisation, normally covered by a contract of employment) and work that is outsourced, and therefore normally carried out under a contract for the supply of services.

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1 EMERGENCE stands for Estimation and Mapping of Employment Relocation in a Global Economy in the New Communications Environment. Between 2000 and 2003, research partners in Australia, Austria, Belgium, Canada, Denmark, Germany, Hungary, Italy, Sweden and the UK, with associates and subcontractors in many other countries, are undertaking a range of related research activities, full details of which can be found on http://www.emergence.nu.

2 This paragraph is largely based upon the EMERGENCE survey report, to which we also refer for a more profound description of the research methodology and conceptual framework: Huws U and O'Regan S (2001), *eWork in Europe: the EMERGENCE 18-country employer survey*, IES Report 380.

Figure 2.1: Typology of work delocalisation or eWork

		Contractual: Internal/employees	Contractual: Outsourced
Type of workplace: Individualised (away from 'office' premises)		Employed tele-homeworkers Mobile employees	Freelance eWorkers or mobile workers (= eLancers)
Type of workplace: Collective (on shared 'office' premises)		Remote back offices/call centres Employees working in telecottages or other third party premises	Specialist business service supply companies Outsourced call centres (= eService suppliers)

Source: Huws U, O'Regan S (2001)

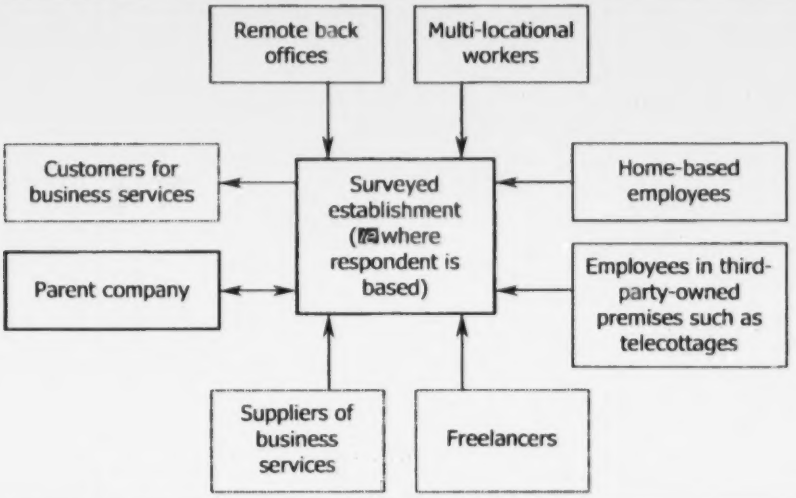
The second is a distinction between work carried out by groups of workers on shared premises (normally a building that could be described as an 'office') and work that is carried out by individuals acting in isolation away from 'office' premises. These people might be working from their homes, or working nomadically from a variety of different locations, for all or part of the working week.

These variables are summarised in Figure 2.1. When combined, they provide us with a two-by-two cell matrix within which all forms of eWork so far identified by researchers can be grouped. In the EMERGENCE employer survey, information is collected on each of these forms of eWork, provided (1) that it is remote, *ie* it takes place at a geographical distance from the establishment where the respondent is based; and (2) that it is telemediated, *ie* that a telecommunications link is used to deliver the work.

Having identified the different ways in which work may be delocalised, it is then necessary to categorise the kinds of activities involved in this delocalisation. It was decided that the most stable and comparable, and therefore the most useful unit of analysis, was the generic business function. After an intensive review of the evidence, it was decided that most forms of eWork could be categorised within seven of these generic business functions:

- customer service, including providing information, counselling and advice
- sales (telemarketing and mobile sales)
- data processing, typing and other forms of data input
- software development, maintenance and support
- accounting, debt collection and other financial services
- human resources management and training
- design, editorial and other forms of creative or content-generating work including research and development

Figure 2.2: A conceptual map of the eOrganisation



Source: Huws U, O'Regan S (2001)

The basic unit of study in the EMERGENCE employer survey is the 'establishment'. However, there are a number of different ways in which this geographical concept may be related to the legal concept of the 'firm' or the 'organisation'.

Figure 2.2 shows a conceptual 'map' of the organisation, which demonstrates diagrammatically all the variables that are captured and mapped in the survey. As well as the inputs of telemediated work categorised above, this also demonstrates the outputs which may be present where the surveyed company is a supplier of telemediated business services. The survey looked not only at the demand for outsourced telemediated work but also on the supply side, *ie* establishment offering remote information services to third party business clients. This is important in the context of this report, as SMEs are expected to play a far more important role on the supply side rather than on the demand side for information services (*cf.* infra).

2.2 What is an SME? The EMERGENCE operationalisation

In order to investigate the role of SMEs in the new economy and the trade in information activities, a clear definition of small and medium-sized enterprises is indispensable. Among all criteria being used to distinguish SMEs from large companies, the number of employees is certainly the most common one (Delmotte *et al.* 2002). However, there appears to be a complete lack of international consensus about where to put the cut-off point. For example, a Belgian company employing 51 employees is already considered to be a big company, whereas a German or American company employing 499 employees is still an SME. The majority of EU countries use a cut-off point somewhere in between these

extremes (*eg* 100 employees in the Netherlands, 200 in the UK). There is not only a lack of consensus between individual countries, but also between international bodies representing these countries: whereas an SME can employ up to 249 employees according to the EU (Eurostat), the OECD is working with a definition going up to 499 employees (Delmotte *et al.*, 2002, p. 7).

Because of the lack of a uniform, globally accepted definition of an SME, we had to construct our own definition, which, as any other definition, is to a certain extent arbitrary. In the EMERGENCE project, an SME has been defined as a company employing up to 200 employees. Because we are interested in the impact in the number of employees on eWork and eSupply practices; and because the overwhelming majority of companies is employing less than 200 employees (*cf.* infra), we further differentiated the group of SMEs. In practice, while presenting our empirical results, we will distinguish between the following categories of companies:

<50 employees: micro firms
50 to 100 employees: small companies
101 to 200 employees: medium-sized companies
>200 employees: large companies

The comparison of the different types of SMEs and big companies, on a number of eWork and eSupply related variables, will contribute to explaining the specificity of SMEs in the new economy as well as clarifying their role in the trade in information activities. As already stated above, this will be done on the basis of a number of hypotheses that are derived from literature. But before focussing on the position of SMEs in the new economy, we have a look at the performance and position of SMEs in the economy in general, including a summary of their overall strengths and weaknesses.

3. SMEs in the Economy: Reviewing some Literature[1]

3.1 Some observations

More than 99.75 per cent of all enterprises in the EU employ less than 250 employees; these companies account for two-thirds of total European employment.Around 93 per cent of all companies employ less than ten persons; about half of these enterprises have no employees at all. The average European company employs not more than six employees (EC 2000). This key information from the European Observatory of SMEs illustrates the incredibly important role of SMEs in the European economy. Table 3.1 gives further details.

The average company size in countries such as the US and Japan is significantly higher than in the EU, as shown by Table 3.2, but small companies still make up for the vast majority of enterprises in all OECD countries (OECD, 2000a). SMEs likewise account for a disproportionately large share of new jobs: in many countries, the highest net job creation rates are among very small firms (OECD, 1999a). 'In other words, small business is big business' (Davis and Austerberry 1999, p. 29).

Table 3.1: Main indicators of non-primary private enterprises, EU, 1998

		0–9 employees	10–49 employees	50–249 employees	total 0–249 employees	250 or more employees	total
Number of enterprises	n (x 1000)	18,040	1,130	160	19,330	38	19,370
	% of total	93.13	5.83	0.83	99.80	0.20	100
Employment	n (x 1000)	33,360	21,320	14,870	74,550	38,680	113,230
	% of total	33.88	18.83	13.13	65.84	34.16	100
Average enterprise size*		2	20	90	4	1,010	6

* Due to rounding, one cannot derive average enterprise size from the data on employment and the number of enterprises.

Source: EC, 2000, p. 45

[1] As different authors and sources of information use different definitions of an SME, the literature review should be interpreted with necessary caution.

Table 3.2: Employment in non-primary private enterprise, EU, USA and Japan, 1996 (%)

	0–9 employees	10–49 employees	50–249 employees	total 0–249 employees	250 or more employees	Total employment ▪ 1,000	Occupied persons per enterprise
EU	34	19	13	66	34	113,230	6
USA	11	19	12	42	58	105,240	19
Japan	n/a	n/a	n/a	33	67	57,345	10

Source: EC 2000, p. 47

The predominance of SMEs, not only in the number of companies but in total employment, is far from new, but it further increased during the eighties and nineties (Delmotte *et al.*, 2002). In this respect, the OECD is talking about a subtle but steady increase in the share of employment provided by smaller firms, accompanied by a reduction in the average size of firms and establishments (OECD, 1996). The most recent SME Outlook has reconfirmed this pattern: 'Average firm size in OECD countries is declining. In the US and Japan, SMEs have had relatively large workforces, but their average size is decreasing due to downsizing of larger firms which now concentrate on core competencies and contract out other functions. [...] The vast majority of enterprises in OECD countries are SMEs. And as larger firms outsource more functions, the weight of SMEs in the economy will increase. SMEs will continue to get smaller and will be found mostly in service sectors, particularly strategic business services.' (OECD, 2000a, p. 7).

3.2 Why this renewed attention to SMEs?

The attention given to SMEs in scientific research as well as policy debates increased a lot in the course of the years. There are many possible explanations for this observation:

- One of them is related to the so-called 'tertiarisation' of the economy. SMEs have always played an important role in the service sector and the gradual transfer from an industrial to a service economy logically upgraded the position of SMEs in the economy (Delmotte *et al.*, 2002). The relative dominance of small companies in the service sector is well supported by empirical evidence. For example, the number of employees in the average manufacturing company is almost three times as high as in the average service company, be it business or personal services (on the basis of EC 2000, p. 50-52). 'With the exception of six service sub-sectors, the remaining sub-sectors have more than 60 per cent of their employment concentrated in SMEs, where in some cases this percentage goes up to more than 80 per cent of total employment' (EC 2000, p. 325). SMEs are expected to play a particularly important role in a whole range of new business services. The strong growth of knowledge-based services in recent years (see *eg*, OECD, 2000b)

further upgraded the role of SMEs in the economy. We will come back to this in Chapter 4.

- Another important reason for renewed SME-attention is related to outsourcing and downsizing trends. Increased outsourcing not only reduces the average size of companies; it simultaneously creates new opportunities for smaller companies that, by concentrating on a few selected assets (like skills), can become the suppliers to larger companies for whom these are not core activities (Quinn, 1992). In line with this, 'the downsizing waves in large enterprises have turned the attention towards the SME as an engine of economic growth and employment' (Clarysse *et al.* 1998). But why should (bigger) companies downsize and/or outsource more activities than in the past, thereby creating new opportunities for SMEs?

  Many authors link the tendency of increased outsourcing to the so-called 'transaction cost theory' (Williamson, 1975; 1985). Transaction or interaction costs represent the money and time expended whenever people and companies exchange goods, services, or ideas. The exchanges can occur within a company or between a company and a customer (either a business client or the ultimate consumer), and they can take many everyday forms, including management meetings, conferences, phone conversations, sales calls, reports, and memos. In a real sense, transaction costs are the 'friction' in the economy. They are determined by the degree of uncertainty and recurrence of economic transactions, as well as the so-called 'asset specificity' – *ie* the degree to which transaction-specific investments are required. Taken together, transaction costs determine the 'make it or buy it' decision and impact on the way companies organise themselves and form relationships with other parties. All else being equal, a company will organise itself in whatever way minimises overall transaction costs. Changes in transaction costs can cause companies and even entire industries to reorganise rapidly and dramatically. And this is exactly what is expected to happen because of the rapid dissemination of information and communication technologies.

  In the literature, there is widespread agreement that modern ICTs have significantly lowered transaction costs and they continue to do so: 'The world economy is on the verge of a broad, systemic reduction in interaction costs' (Hagel and Singer 2000, p. 148). These authors continue by arguing that: 'electronic networks, combined with powerful PCs, are permitting companies to communicate and exchange data far more quickly and cheaply than ever before. As business interactions move on to electronic networks such as the Internet, basic assumptions about corporate organisation will be overturned. Activities that companies have always believed to be central to their businesses will suddenly be offered by

new, specialised competitors that can do those activities better, faster, and more efficiently' (*ibid.*, p. 148). In line with this, we can refer to Brynjolfsson *et al.* (1993, p. 3): 'In general, by reducing the costs of many of the information searching and accounting activities that are needed for co-ordination with external suppliers, IT can make buying things externally more attractive to firms'. Many authors also argue that ICTs have made economic activities less tied to a particular location.[1] In terms of Williamson's transaction cost theory, ICTs have reduced the impact of the site asset specificity of many economic transactions, thereby lowering the need for transaction-specific investments and favouring the 'buy it' option. Noteboom and Klos (1998), finally, conclude that 'ICT will make the market more attractive, and this will result in increased levels of outsourcing and smaller companies' (*ibid.* p. 14). Analogous arguments – ICT lowering the costs of market transactions, making markets more transparent thereby stimulating outsourcing and creating new business opportunities for SMEs – can be found, among others, in Schmidt (1996), Schienstock *et al.* (1999b), Doig *et al.* (2001) and Van der Hallen (2001).

A third, albeit interrelated reason for a gradual shift in attention from large companies to SMEs is related to the dysfunctions of large companies in comparison with SMEs; dysfunctions that are becoming very clear in a changing business environment characterised by more demanding criteria for achieving competitiveness. The general strengths and weaknesses of SMEs vis-à-vis large companies will be discussed in the next paragraph. We limit ourselves to giving one literature fragment here (Schienstock *et al.* 1999b, p. 59-60):

> *'In a globalising economy, where innovation competition dominates and customers no longer accept standardised mass products or services, but ask for individual solutions, markets become unstable, insecure and complex. Companies have to develop organisational structures and channels of information flow that can cope with uncertainty. Production can no longer be organised according to Fordist principles; instead, more flexible organisation forms are needed which allow for extensive information and knowledge exchange to improve and speed up innovation processes. Big companies therefore reduce their size and become leaner to get the same entrepreneurial dynamism, innovativeness and informalism as small companies often have, to be able to react as quickly and flexibility as those do. [...] This results in smaller organisations with a more simple structure, which are supplied more frequently in smaller batches and therefore become more dependent on other companies.'*

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[1] For a critical examination of this thesis, we refer to: Huws U (1999): 'Material world. The myth of the "weightless economy"', in Panitch L, Leys C (eds) *Global capitalism versus democracy*, New York: Monthly Review Press, pp. 29-55.

The tendencies prevailing in mainstream literature should of course be taken with a pinch of salt. In fact, a lot of authors have already criticised the outsourcing and 'small is beautiful' literature (see, *eg* Van Hootegem, 2000; Reitsma, 2000), mainly because: 'the speed of organisational change suggested in literature is heavily contrasting with the slowness of empiricism' (Dejonckheere and Van Hootegem 2001b, p. 29). 'The process of outsourcing is taking off rather slowly and few organisations feel influenced by a heavy 'centrifugal force' making them focus on their core activities alone whilst outsourcing all the rest' (*ibid.*, p. 29). However, the observation that outsourcing and scaling down is an emerging *rather than completed process* is no reason to postpone the debate on the related challenges, threats and opportunities for SMEs. In fact, the literature fragment of Schienstock *et al.* (1999b) is already referring to some specific advantages of SMEs as opposed to bigger companies. We now elaborate a little further on this.

3.3 General strengths and weaknesses of SMEs[1]

3.3.1 Weaknesses of SMEs

Limited financial resources

This is probably the most important barrier for the startup of many new businesses and further development of SMEs. A lot of authors stress this problem, in various ways. Schmidt talks about restricted access to financial credit (1996); the Observatory of European SMEs refers to difficulties in obtaining loans (because of guarantees demanded by banks, lead time to approval, *etc.*) as well as high financial costs (because of higher interest rates, unfavourable repayment conditions, *etc.*) (EC 2000); Delmotte *et al.* (2002) further argue that the familial interests of many SMEs can hinder opening up the company capital for potential 'external' investors and this can have serious implications for the growth of SMEs; *etc.*

Low degree of professionalism

This does not refer to a lack of education or skills, but rather to the necessity of incorporating external persons (besides the initial founders or family) at the top of an SME. Very often, external professionals are able to interpret results and strategies in a more objective way than family members are. Among others, a low degree of professional employment can reveal itself in underestimating the importance of strategic planning.

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[1] This chapter is mainly based on the work of Delmotte *et al.* (2002), but includes additional literature references where relevant.

Difficulties in recruiting qualified staff and skilled workers

(*eg* OECD, 1997). This is mainly related to less favourable working conditions, lower wages and the lack of promotion or career possibilities. SMEs rarely have a professional in-house recruitment department; furthermore, the services of external HR consultants are often considered to be too expensive (Letouche, 1995).

Dependency upon clients and suppliers

This can also play a constraining role in small companies. As to the clients, SMEs are often very dependent on the local market. But the dependency on suppliers constitutes a bigger problem; supplying companies are often bigger than the SME-client and this can weaken the bargaining position of the latter.

The absence of economies of scale

This is due to small plant size. Among others, this can result in limited sales promotion and branding capabilities (Schmidt, 1996).

3.3.2 Strengths of SMEs

Flexibility, adaptability and speed of decision-making are undeniably the most important assets of small companies when compared to big, often heavily structured companies that are not able to react to a changing economic environment in such a dynamic way. To use the words of Van Kirk and Noonan (1982, p. 3): 'Small businesses clearly have the ability to strike fast, while their counterparts in big business are sometimes shackled with a bureaucracy of red tape and a painfully slow decision-making process.'

Delmotte *et al.* (2002) also argue that SMEs are able to adapt themselves rapidly, flexibly and decisively to changing market circumstances and customer needs. They mainly assign this virtue to the simple and flexible organisation structure of SMEs, which has clear advantages over the heavy structures of big companies: 'The entrepreneur of an SME maintains direct relations with personnel. This fosters the suppleness of vertical communication in both directions and makes it possible to effect rapid and flexible adaptations within the company' (*ibid.*, p. 23). In line with this, 'SMEs are less bureaucratic, without layers of 'abominable no-men' who block daring ventures in a more highly structured organisation' (Schmidt, 1996, p. 12).

Some authors mention that the familial mentality of many SMEs, which was one of the 'weaknesses', can easily be turned into a competitive advantage. If there is a good equilibrium between the family interests and business economics, the familial structure can

serve as a driving force behind the company, driven by assets such as strong motivation, clear know-how, fluent co-operation and communication and a social company culture (*eg* Donckels, 1989).

Finally, Delmotte *et al.* refer to specialisation and quality as important assets of SMEs: 'Specialisation allows the SME to offer a quality product or service' (2002, p. 24). By that, they can find a profitable niche somewhere in a value chain (Schmidt, 1996).

3.4 In brief

SMEs account for the overwhelming majority of all companies and make a very crucial contribution to total employment. In the course of the years, the dominant position of SMEs has even increased, because of a number of interrelated factors such as the tertiarisation of the economy, increased downsizing of big companies, increased outsourcing in more transparent markets characterised by lower interaction costs, the dysfunctions of traditional large companies, and virtues of small companies in a rapidly changing economic environment.

Bearing this background information about the position, strengths and weaknesses of SMEs in mind, we now turn to the real core of this report, *ie* the role of small and medium-sized businesses in the so-called 'new' economy. To be able to specify this role, we formulate ten hypotheses concerning the impact of company size on the prevalence of different eWork-practices as well as the trade in information services. Afterwards, these hypotheses will be tested by means of empirical results of the EMERGENCE project, which, thanks to its broad covering of the key aspects of eWork, will enable us to accept, reject and fine-tune all of them.

4. Ten Hypotheses about SMEs in the New Economy

4.1 Less eWork in SMEs?

Literature on SMEs in the new economy is characterised by two, at first sight contrary, streams. On the one hand, SMEs are often considered to be 'the most dynamic sector of the knowledge-based economy' (OECD, 1999b, p. 33); they play a 'significant role as a source of innovation during the early stages of new and emerging technologies' (Motwani *et al.* 1999, p. 106). But on the other hand, there is a body of literature expressing the fear that SMEs are not able to cope with the technological revolution and the challenges of globalisation. This fear mainly results from the observation that SMEs are often at a disadvantage in the access to new technology: 'SMEs generally adopt technologies more slowly than the average firm, and this also applies to the adoption of Internet technologies (OECD, 2000b, p. 5). A lot of technology surveys and monitoring systems indeed show that SMEs often have limited technological possibilities, a less advanced IT infrastructure, fewer external network connections, *etc.* (*eg* EITO, 2001; Schienstock *et al.* 1999a).

Smaller firms less frequently have access to the Internet[1] and if they do, they use the Internet for more basic applications than bigger companies. Very often, the technological arrears are ascribed to limited financial resources (*eg* Schmidt, 1996), a lack of expertise or professionalism (Delmotte *et al.*, 2002), limited understanding of the complexity of, for example, e-Commerce (OECD, 2000a), a shortage of suitable and well-educated personnel (Cowling and Storey, 1998), the perception of Internet not applying to the enterprise (EC, 2000), *etc.* Many of these reasons are related to the general weaknesses of SMEs as described in Chapter 3.

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[1] The ENSR Enterprise Survey of 1999 revealed the following Internet penetration rates in the EU for different size categories (EC, 2000, p. 180):

	No. of employees			
	0	1-9	10-49	50-249
companies with direct Internet access	33%	49%	67%	86%

Because information technology and a decent telecommunications link is a prerequisite for each form of eWork as defined by the EMERGENCE project (*ie* remote information work using ICT for the receipt or delivery of the work), and because a lot of SMEs seem to lag behind in the field of technology, we firstly hypothesize the frequency of eWork to be lower in SMEs.

But how can this hypothesis be reconciled with the other stream of literature, talking about a significant presence of SMEs in technology-intensive industries as well as strategic business services? (OECD, 2000b). The answer to this question is to be found in the enormous heterogeneity of the group of companies commonly categorised as SMEs. 'SMEs can include everything from the corner hairdresser and grocer to high technology firms. [...] So while SMEs in high tech sectors can make intense use of science-based knowledge and are active technology developers, most SMEs operate in medium to low technology environments' (OECD 2000c, p. 8). Because the majority of SMEs operate in a medium to low technology environment, we expect the entire group of SMEs to score significantly lower than big companies in the field of eWork. When separating the small group of SMEs belonging to the so-called 'knowledge sector',[1] however, we no longer expect to find lower levels of eWork. We summarise our first hypotheses as follows:

Hypothesis 1: The frequency of eWork is lower in SMEs than in big companies.

Hypothesis 2: When looking at the knowledge sector only, company size does not have a significant impact on the frequency of eWork.

4.2 Other types of eWork in SMEs?

Two important questions have been used to categorise the different types of eWork distinguished in the EMERGENCE project (*cf.* Figure 1): Is the work carried out by own employees or is it outsourced? Is the work carried out by groups of workers on shared premises or by individuals acting in isolation away from 'office' premises? For each of these two dimensions, we draw a hypothesis on the comparison between SMEs and large companies.

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[1] The NACE-categories, which are regarded as part of the 'knowledge sector' in the EMERGENCE project, are listed in Appendix 1. Whilst recognising that this categorisation is by no means ideal, it was felt after much discussion and investigation to be the nearest approximation available within the existing NACE classification scheme. The sectoral composition of the 'knowledge' or 'information services' sector is further discussed in Huws U and O'Regan S (2001), *eWork in Europe: Results from the EMERGENCE 18-country Survey*, IES Report 380, and Huws U (2001), *eWork Indicators: a Discussion Paper*, IES Report 385.

4.2.1 eOutsourcing versus eEmployees?

In comparison with big companies, we expect small companies to favour in-house eWork strategies rather than opting for an external solution, *ie* outsourcing. We mainly do so because a lot of SMEs fear the loss of their independent position, they fear domination by the external service suppliers and becoming dependent on third parties who are often bigger than they are. This is in line with the results of a qualitative study of Belgian SMEs (Letouche, 1995, p. 121): 'For SMEs, outsourcing often comes down to a loss of autonomy and self-reliance; it can endanger the 'entrepreneurship' of the SME and create dependency. By relying on external parties, the identity of the SMEs becomes less controllable'. We can also refer to the results of Schienstock *et al.*, (1999a). In comparison with large companies, far more small companies answered positively to the question whether they fear dependency on external IT-suppliers.

Another reason for SMEs not to engage in outsourcing that often, be it outsourcing to companies or to freelancers, is the lack of knowledge of the market of service suppliers. SMEs often have difficulties in finding their way in a rather nontransparent supply of external services. According to Letouche (1995), a lot of entrepreneurs are convinced that external suppliers are serving the needs of big companies only. Furthermore, 'they consider private consultants to be 'obtrusive specialists' which are unaffordable for SMEs anyway' (*ibid.*, p. 119). Conversely, many service supply companies have difficulties in approaching SMEs, which they consider to be a rather unstructured and not very accessible world. 'Advice is being disregarded by 'obstinate entrepreneurs' who want to keep everything under control and who are not willing to invest enough in decent, specialised services' (*ibid.*, p. 119). Very often, SMEs are not the most interesting clients for specialised service suppliers and economies of scale certainly play a role in this respect. For some activities (*eg* call centre work), a critical size or scale is needed before being able to envisage outsourcing.

Because of the above-mentioned difficulties with external service provision, we hypothesise that SMEs will score relatively weakly in the field of eOutsourcing and inversely, relatively well in the field of in-house eWork.

4.2.2 Individualised versus collective eWork?

Simply for reasons of scale and size, we expect SMEs to score higher in the field of individualised rather than collective forms of eWork. For example, it is rather unrealistic for a small company to have a regional back office or to put a significant number of employees in a telecottage – otherwise, it would no longer be a small company. Individualised forms of eWork, such as telehomework or mobile telework, are less tied to particular

minimal company size. Away from traditional office premises, these individualised eWork forms can be observed in the smallest companies. In fact, a lot of business startup companies exploit teleworking, be it on a freelance or contract basis, as a first step. According to Selby and Wilson (2001, p. 10), 'sole traders and freelancers who telework often start new business activities with low overheads. Such businesses often expand to employ more workers, but there are many examples of startups which exploited teleworking as a first step.'

4.2.3 In brief

We expect the frequency of the aggregate variable eWork to increase with company size (= hypothesis 1). However, we have good reasons to assume that the 'lead position' of large companies (or 'the arrears' of SMEs) will depend on the type of eWork. We first repeat the two hypotheses regarding the basic dimensions of the eWork typology. Combining these two hypotheses, we then logically derive a new one:

Hypothesis 3: In relative terms, SMEs make more use of eEmployees rather than eOutsourcing.

Hypothesis 4: In relative terms, SMEs make more use of individualised rather than collective forms of eWork.

Hypothesis 5: In relative terms, SMEs make most use of telehome-workers and mobile teleworkers, and least use of eOutsourcing to companies.

4.3 Locations involved in remote work and reasons for their choice

For all forms of eWork, additional questions have been asked in the EMERGENCE survey concerning the location of the remote activities: *eg*, is the work carried out within the same region as the respondent, in another region of the same country or is the work being delivered from abroad? Furthermore, the concrete reasons for choosing a particular location and/or for choosing a particular supplier of eServices (in the case of outsourcing) have also been investigated: is it mainly because of the low cost of a region, because of the technical expertise, the quality and reliability of the eService supplier, *etc.*? We formulate two hypotheses concerning the impact of company size on the locations involved in remote eWork and the reasons for their choice.

4.3.1 Smaller geographical scope of remote eWork in SMEs?

We hypothesise that the geographical scope of remote eWork will increase with company size. To be correct, we expect SMEs to

score relatively well in the field of eWork within their own region and relatively weakly in the field of eWork being delivered from abroad. We mainly do so because of the observation that; 'the majority of SMEs are still local players which mainly operate in domestic markets' (Schmidt, 1996, p. 8). They are very dependent on the local market (Delmotte *et al.*, 2002) and are often confronted with many barriers to internationalisation such as 'difficulties in forming international partnerships, a lack of managerial experience and competence to exploit international business opportunities, difficulties in gathering information about the global markets, technologies and competitors, cultural distance as a barrier to successful international partnerships, *etc.*' (Karazoglu and Lindell 1998, p. 54).

These assumptions are in line with the empirical results of Schienstock *et al.* (1999a). An investigation of the widest operated market ('furthest market position') of 800 European companies revealed very significant differences between small (20 to 49 employees) and big (>50 employees) companies, even when sector is controlled for. Whereas over half of small companies are active on the regional or national market only, this is the case for only 31.5 per cent of big companies. For activity on a global level, the percentages are almost exactly the other way around[1].

Another indicator of the degree of international activity is the share of total turnover being exported. On average, European companies export 16 per cent of total turnover (EC, 2000, p. 45). However, the tendency to export varies from 7 per cent in enterprises employing less than ten employees to 22 per cent in enter employing over 200 employees (*ibid.*).

On the basis of theoretical and empirical grounds, we make the following assumption:

Hypothesis 6: The geographical scope of eWork and the delocalisation of information activities is smaller in SMEs than in big companies.

4.3.2 Other reasons for choosing a remote location and/or eService supplier

The EMERGENCE questionnaire listed a whole range of potential reasons for choosing a remote location and/or eService supplier (in the case of outsourcing). Examples of these reasons are

[1] Own calculations on Schienstock *et al.* (1999a) give the following results:

	Furthest market position %			
Company size	**Regional**	**National**	**European**	**Global**
20-49 employees	13.2	40.2	15.4	31.3
>50 employees	8.0	23.5	16.2	52.3

technical expertise and right software, low cost or most competitive tender, 'we happened to know them', geographical proximity, *etc*[1]. In line with the previous hypotheses, we do not give an opinion about the absolute importance of these and other reasons, but focus on alleged differences between SMEs and large companies. In general, we expect the reasons for choosing a remote location and/or eService supplier to vary significantly with company size.

Because limited financial resources is undeniably the most important 'weakness' of SMEs in comparison with bigger companies (*cf.* section 3.3.1), we hypothesise the cost reason ('low cost/most competitive tender') to play a particularly important role in SMEs.

In addition, we expect informal contacts ('we happened to know them') to be more important in SMEs than in big companies. This is in line with the findings of some case studies about the relocation of eWork conducted in the Benelux. The relocation stories of SMEs seemed to deviate significantly from the ones of bigger companies. In general, the SME-relocations were taking place far more informally, the actual decision-making processes was often more influenced by coincidental relationships and connections rather than profound feasibility studies or detailed cost-benefit analyses (Dejonckheere *et al.* 2002).

An EU research project dealing with the challenge of globalisation for European SMEs, reported more or less the same finding (Schmidt *et al.*, 2001, p. 6): 'Yet all teams report that SME owners and managers mostly use personal networks to find potential interesting partners. Sometimes social networking is even a method in its own right to gain access to foreign markets. Even when firms just want to establish stable relations to suitable distributors of their products abroad they rely heavily on social networking (approaching someone who knows someone who knows – also called 'matchmakers'). Otherwise, they hardly get access to those persons and clients they need or can trust.'

We summarise the information given in this paragraph in the following hypothesis:

Hypothesis 7: The reasons for choosing a remote location and/or eService supplier vary significantly with the size of a company. In relative terms, cost considerations and informal contacts play a more important role in the decision-making process of SMEs.

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[1] For an exhaustive list of the reasons, we refer to the EMERGENCE survey report (Huws and O'Regan, 2001).

4.4 Are SMEs important suppliers of eServices?

The hypotheses derived so far all deal with the 'demand side' for information activities and eWork. By this we mean companies which have a clear need or demand for telemediated work for their own functioning. This demand for eWork can either be fulfilled by means of in-house solutions (*cf.* various types of eEmployees working from a distance), or by means of outsourcing (a so-called eService supplier is delivering the information work from a distance). The EMERGENCE survey looked not only on the demand side for outsourced eWork, but also on the supply side, *ie* companies supplying telemediated information activities to third party companies. Whereas hypotheses 1 to 7 deal with SMEs and their own needs for eWork (*ie* the demand side), we now want to focus on the supply side and the specific role SMEs play in the supply of eServices to other companies.

In general, we expect SMEs to play an important role in the supply side of the trade in information activities. In other words, we expect a significant part of telemediated information activities or eServices distinguished in the EMERGENCE project, to be delivered by SMEs. Many of the most dynamic new eBusinesses have started up as very small firms and it seems likely that much of the supply of other knowledge-based products or services, ranging from multi-media content to accountancy or software services, may originate in establishments with fewer than 50 employees. This general expectation is in line with mainstream literature and policy documents. According to the OECD (2000a, p. 7), for example, 'SMEs play a key role in strategic business services, including computer software and information processing, research and development (R&D) and technical testing, marketing, business organisation and human resource development'. The fact that the average firm size in strategic business services is a fraction of the average size of firms in manufacturing or in the economy as a whole is an indication of the importance of SMEs in this field (see, *eg*, OECD, 2000b; EC, 2000).

The information given so far describes the key role of SMEs in supplying strategic business services, but it does not explain it. In the following, we present some mutually interrelated and reinforcing factors explaining the hypothesis about the relative dominance of SMEs in the field of supplying eServices.

4.4.1 Increased outsourcing of information activities and new opportunities for SMEs

In Chapter 3, we discussed the new business opportunities for SMEs resulting from a general increase in outsourcing. We mainly did so by making use of transaction cost theory. This theory applies to outsourcing as such, but all the more to the outsourcing of the business services being studied in EMERGENCE, simply

because of the immaterial nature of these services. ICT not only lowers the cost of, for example, information searching and accounting activities that are needed for co-ordination with external suppliers, but because of the immaterial nature, it also reduces the cost of delivering the work and it allows for significant remote control possibilities (see, *eg*, Dejonckheere and Van Hootegem, 2001a; Flecker *et al.*, 2000). Because outsourcing creates new opportunities for SMEs specialising in the supply of this work to bigger companies and because ICT makes it especially easy to outsource information activities, we expect SMEs to be particularly strong in the supply of these activities.

This expectation is more or less in line with the findings of the OECD (2000a, p. 7): 'Increased outsourcing by major manufacturing firms, combined with new technologies that have allowed SMEs to win market niches, has led to ten per cent annual growth in these knowledge-based services in recent years.' The new opportunities for small companies in the field of supplying business services also appear from an analysis of new enterprises and startups in Denmark: 'If the population of new enterprises is broken down by economic activity, it is obvious that the new enterprises reflect the general development towards a service and knowledge based economy as the share of manufacturing industry is declining from nine (1990) to only six per cent of all new enterprises in 1998. On the other hand, Business Services constitutes around one-third of all new enterprises with IT Consultancy Services as the dominant single activity – growing from around 800 new enterprises in 1990 to around 1400 in 1998' (Nielsen 2001, p. 7).

The observation that a lot of startup companies – whom we assume to be rather small – specialise in the supply of business services is not only related to increased outsourcing of these services by bigger companies, but also to the following argument:

4.4.2 Relative low costs of starting-up and exploiting an eService company

Limited financial resources are an important barrier to the startup and further development of many SMEs: 'the most important problem that startups face is related to getting the necessary financing to start a business' (EC 2000, p. 344). 'However', the authors continue, 'this problem is probably less important for enterprises in the service sector than in other sectors. These enterprises, especially knowledge-based services, do not need large assets to perform their services and therefore need mainly working capital' (*ibid.*, p. 344). The increased availability of technology at low cost is often considered to be a factor that can enhance entrepreneurship, because it permits easier access to information and lowers the cost of startup in the case of many intangible services. Nylander and Ylöstalo, for example, argue that 'global telecommunications and open technologies are

lowering the entry barrier for SMEs to adopt the newest communication technology' (1998, p. 9). As the cost of information and communication technology keeps decreasing, the startup and operating costs of many eService businesses do so as well and we expect this to enhance the potential contribution of smaller firms.

In brief, budgetary restraints form a significant barrier for many SMEs. Because this barrier seems to play a less important role for companies specialising in the supply of information services, we expect SMEs to perform relatively well in this field. Not only is a crucial 'weakness' of SMEs becoming less important in the new economy, but several important 'strengths' of SMEs are also becoming more important.

4.4.3 Developing the assets of SMEs in the supply of knowledge-intensive business services

Compared to traditional services, a lot of new business services are characterised by a high degree of complexity, insecurity and knowledge intensity (Tessaring, 1998). Schienstock *et al.* (1999) use the term 'knowledge intensive business services' when referring to activities such as design, R&D, marketing, customer service, management, *etc.* In mainstream literature, there is widespread agreement that flexibility, customisation and innovativeness have become key criteria for companies specialising in the supply of these activities (*eg*, OECD 2000c; Dejonckheere and Van Hootegem, 2001b).

In Chapter 3, we already mentioned flexibility, adaptability and speed of decision-making simply to be important assets of SMEs. In addition to this, there is increasing evidence that SMEs play a key role in pioneering and developing new markets. They tend to be quicker in responding to new opportunities than large firms, and this has led to a consideration of the advantages of smaller firms as a source of innovation, such as: '(i) a greater tolerance for higher risk initiatives; (ii) a collegial organisational context that values ideas and originality; (iii) a capacity to reap substantial rewards from market share in small, niche markets; (iv) improved capacity for integrating complex sets of information and technologies to create a useful outcome; and (v) greatly increased cohesion and sense of collective purpose where all may profit directly from a successful new innovation' (Acs and Audretsch, 1996). In addition to this, innovative activity flourishes especially vigorously in environments free of bureaucratic constraints. A number of SMEs have in fact benefited from the exodus of researchers thwarted by the managerial restraints of larger firms. Larger firms also tend to promote successful researchers to management positions, while SMEs can place innovative activity at the centre of their competitive strategy (OECD, 2000c).

In brief, there is widespread agreement in the mainstream literature that flexibility, creativity, innovativeness and

entrepreneurial dynamism are becoming very crucial criteria for achieving economic success in the new economy and trade in new business services. Because these elements have always been important assets of SMEs, we expect them to play a particularly important role in the supply of knowledge intensive business services.

4.4.4 The virtues of networking among SMEs

A lot of the literature on the new economy refers to the potential use of the Internet and enterprise networking technology among SMEs for business co-operation. According to the European Observatory for SMEs, 'co-operation among SMEs in networks based on Internet technology can open new markets. Of special interest are networks enabling small enterprises to compete jointly with larger enterprises in markets otherwise only reserved for the large enterprises' (EC 2000, p. 174)

During the 1990s, co-operation between firms increased due to the rapid diffusion of modern ICT and decreasing costs of using information technology (Nylander and Ylöstalo, 1998, p. 3). By forming ICT-based collaboration networks with other SMEs, small companies can overcome typical shortcomings such as the inability to achieve economies of scale and can gain rapid access to skills, capital and knowledge (Selby and Wilson, 2001). Besides overcoming some of the weaknesses of operating in isolation, networking allows SMEs to combine the advantages of smaller scale and greater flexibility with economies of scale and scope in larger markets – regional, national and global. To make it more concrete, potential benefits of networking with other SMEs stem, for example, from 'greater access to information, the presence of concentrated and often specialised labour markets, proximity to suppliers and customers, the increased practical opportunities for mutual gains from joint marketing, technology sharing, mutual credit guarantee programmes and various other forms of inter-firm collaboration' (OECD 2000d, p. 2-3).

In brief, ICT-based networking is considered to give a lot of new opportunities for SMEs offering eServices in the new economy. We therefore expect SMEs to play an important role on the supply side of new business services.

4.4.5 Deriving supply-side hypotheses

In comparison with SMEs, we expect the demand for information activities and eWork to be higher in large companies (= hypothesis 1). We especially hypothesise that big companies outsource more information work and business services to third party companies (= hypothesis 3). Any outsourcing relationship, of course, involves two parties. In this paragraph, we focussed on the supply side of an outsourcing relationship, *ie* companies

supplying telemediated information activities to other companies, their business clients.

In general, we expect a significant proportion of eServices to be delivered by SMEs. We do so (1) because increased outsourcing of information activities is resulting in new business opportunities for SMEs specialising in these fields; (2) because of the low degree of capital intensity of many eBusinesses resulting in relative low startup and exploitation costs – in this way, a traditional weakness of SMEs is becoming less important in the new economy; (3) because flexibility and innovativeness – traditional strengths of SMEs – appear to be all the more important for the supply of knowledge intensive business services; and (4) because electronic networks and clusters allow SMEs to combine the advantages of small scale with various of the benefits of large scale.

In essence, typical weaknesses of SMEs are becoming less important in the new economy, or they can be mitigated, for example, by means of networking, whereas typical strengths can increasingly be cashed in.

So far, all SMEs have been treated as one monolithic bloc without taking into account the enormous heterogeneity of the population of small and medium-sized enterprises (see, *eg*, Brytting, 1991; Julien 2001). The arguments listed above are especially valid for SMEs belonging to the so-called knowledge sector. When looking at the knowledge sector only, we expect SMEs to be extremely important suppliers of eServices, more important than big companies. We therefore formulate a separate hypothesis for this small group of SMEs. For the entire group of SMEs, including the SMEs operating in medium to low technology environments, we construct a more moderate hypothesis in which we only compare the supply and demand side of the trade in information activities (without making an explicit comparison between SMEs and large corporations):

Hypothesis 8: In relative terms, SMEs are more important on the supply side of the trade in information activities than on the demand side.

Hypothesis 9: When looking at the knowledge sector only, SMEs are more often supplying telemediated information activities than big companies.

This constitutes a refinement of the general supply-side hypothesis in relation to the type of SME: does the SME belong to the knowledge sector or not? Analogously, we can make a refinement based on the type of business function being delivered remotely. The list of generic business functions covered by the EMERGENCE survey has been listed whilst describing the project in Chapter 2. Bearing the general strengths of SMEs in mind – flexibility, innovativeness and creativity – we expect SMEs to be particularly important in the supply of creative work as well as

the most knowledge-intensive business functions. Compared to other business services, services such as software development and R&D are characterised by a high degree of complexity, insecurity and knowledge intensity (Tessaring, 1998). Furthermore, they do not require large assets, but mainly working and human capital (EC, 2000). We therefore expect SMEs to be important suppliers of this kind of work to third party companies.[1]

Customer service and other call centre activities, on the other hand, tend to be more susceptible to economies of scale (see, *eg*, Keizer, 2001; Baron and Castricun, 2000) and we therefore expect bigger companies to be more advantageous in the supply of this kind of work.

In general, we expect SMEs to play a particularly important role in the supply of the most knowledge-intensive business functions, and large establishments in the supply of business functions subject to economies of scale. To make it more concrete:

Hypothesis 10: In relative terms, SMEs score best in the supply of software development and creative work, and worst in the supply of customer service activities.

[1] The assumption of SMEs playing an important role in the supply of software development activities is further enhanced by looking at statistical data. According to the European Observatory of SMEs, for example, SMEs clearly dominate the sector of 'computer and related activities'. The average company in this services subsector employs only five employees and ca. 75 per cent of its employment is concentrated in companies employing fewer than 250 employees (EC, 2000, pp. 52, 325).

5. Empirically Testing the Hypotheses

To summarise the results of Chapter 4, on the basis on an extended literature survey, we formulated the following ten hypotheses about the role of SMEs in the new economy and the trade in information activities:

Hypothesis 1: The frequency of eWork is lower in SMEs than in big companies.

Hypothesis 2: When looking at the knowledge sector only, company size does not have a significant impact on the frequency of eWork.

Hypothesis 3: In relative terms, SMEs make more use of eEmployees rather than eOutsourcing.

Hypothesis 4: In relative terms, SMEs make more use of individualised rather than collective forms of eWork.

Hypothesis 5: In relative terms, SMEs make most use of telehome-workers and mobile teleworkers, and least use of eOutsourcing to companies.

Hypothesis 6: The geographical scope of eWork and the delocalisation of information activities is smaller in SMEs than in big companies.

Hypothesis 7: The reasons for choosing a remote location and/or eService supplier vary significantly with the size of a company. In relative terms, cost considerations and informal contacts play a more important role in the decision-making processes of SMEs.

Hypothesis 8: In relative terms, SMEs are more important on the supply side of the trade in information activities than on the demand side.

Hypothesis 9: When looking at the knowledge sector only, SMEs are more often supplying telemediated information activities than big companies.

Hypothesis 10: In relative terms, SMEs score best in the supply of software development and creative work, and worst in the supply of customer service activities.

Analysing the empirical findings from the EMERGENCE surveys allows us to submit the SME hypotheses to an empirical test, with the aim of fine-tuning the specificity of SMEs in the new economy.

Before presenting the results, we elaborate a little further on the empirical data in hand. They can broadly be divided into two groups.

1. The EMERGENCE research consortium carried out a large-scale international survey of employers by means of computer-aided telephone interviews. A highly innovative survey design was used, which, for the first time, captured the full range of possibilities for delocalising telemediated employment within a single research instrument. In total, in the course of the year 2000, no less than 7,268 establishments with fifty or more employees were surveyed in the 15 EU countries as well as three EU Accession States (Hungary, Poland and the Czech Republic).

   The decision to raise the minimum size threshold to establishments with a minimum of 50 employees is not only due to budgetary constraints. Although it was recognised that very small establishments in the knowledge sector, such as design or software companies, might play a significant role in the supply of eWork, it was also recognised that this size category also includes a very large number of small firms in sectors such as artisanal manufacture, agriculture, retail, catering and miscellaneous services, which have very little to do with the supply of eServices. A random survey in this size category, it was felt, would throw up a very high proportion of cases with little or no relevance to the survey and it was therefore decided that a different approach should be adopted in this size category.

2. This approach consisted of undertaking supplementary surveys of establishments with fewer than 50 employees in several countries using the same methodology, but limited only to those sectors which are likely to be involved in the supply of services, categorised as the 'knowledge sector.'[1] So far, supplementary surveys in the knowledge sector have been executed in Denmark (n = 108) and Ireland (n = 100). Other countries (*eg*, Belgium, n = 300) are likely to follow in due course.

   The results of surveys of these so-called micro-firms (<50 employees) have been added to and compared with the overall EMERGENCE survey findings, containing data from small (50 to 100 employees), medium-sized (100 to 200 employees) and large establishments (>200 employees). The comparison of the different size categories on a number of eWork-related variables contributes to explaining the specificity of SMEs in the new economy as well as clarifying their role in the trade in information activities, including facilitators and barriers, threats and opportunities.

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[1] See Appendix 1

Together, the empirical data of the EMERGENCE project provide a highly exceptional, unrivalled source of information about eWork and the demand for and supply of business-to-business eServices, by country, region, sector and firm size. We will now analyse the data in a way that will enable us to accept, reject and fine-tune all the SME hypotheses derived in the previous chapter. In order to have a clear understanding about the interpretation possibilities and limits, and the significance levels used, we refer to the methodological annex VI at the end of this report.

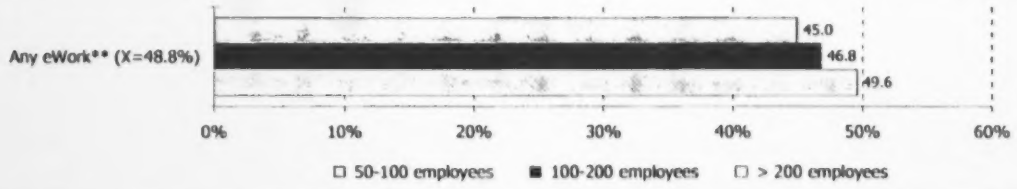
We will first focus on eWork and the demand for information activities (Chapter 6) and then on the supply of telemediated business services (Chapter 7). In Chapter 8, we compare the impact of the establishment size (the number of employees) with other potentially influencing variables such as the economic sector or country under investigation.

6. eWork and the Demand for Information Activities[1]

6.1 Less eWork in SMEs?

On average, 48.8 per cent of European establishments already practice some kind of eWork, encompassing any work that is carried out away from an establishment and managed from that establishment using information technology and a telecommunications link for receipt or delivery of the work (Huws and O'Regan, 2000). In small establishments (50 to 100 employees), only 45 per cent practice any kind of eWork; the percentage of large establishments (>200 employees) doing so amounts to 50 per cent (Figure 6.1).

Figure 6.1: eWork by establishment size (%)[2]



Source: EMERGENCE European Employer Survey 2000 (n = 7,305). Weighted figures.[3]

1 Before starting the presentation of the empirical results, we briefly repeat the EMERGENCE definition of SMEs and the categorisation of establishments on the basis of the number of employees (*cf.* section 2.2):

- <50 employees: micro firms
- 50 to 100 employees: small companies
- 101 to 200 employees: medium-sized companies
- 200 employees: large companies

2 For all Figures presented in this report:

- X = average frequency, the (weighted) average of the three size categories
- χ^2 – levels of significance; * = $p < 0.05$, ** = $p < 0.005$, *** = $p < 0.001$

3 The 7,305 observations have been weighted on the basis of three factors: country, sector and size. More information on the concrete weighting of the data can be found in Huws and O'Regan (2001).

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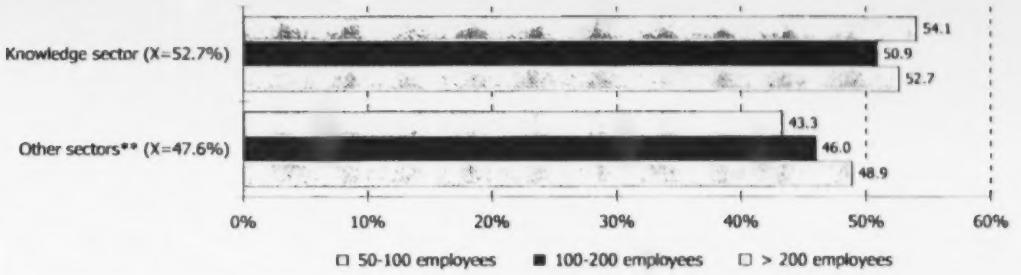
Figure 6.2: eWork by size: the knowledge sector versus other sectors (% eWork)



Source: EMERGENCE European Employer Survey 2000 (n = 7,305). Weighted figures.

Because the frequency of observing eWork increases with the size of an establishment and because the difference is statistically significant, the results from the overall EMERGENCE survey allow us to support hypothesis 1:

Hypothesis 1: The frequency of eWork is lower in SMEs than in big companies.

We derived this hypothesis because SMEs often adopt technologies more slowly than large establishments and this also applies to the adoption of Internet technologies, a *conditio sine qua non* for each form of eWork as defined by the EMERGENCE project. At least, this is the case for the entire group of SMEs, many of which operate in a medium to low-tech environment. But what happens if we look at the knowledge sector[1] only? Does size still impact on the frequency of eWork?

In general, establishments in the knowledge sector practice eWork more often than establishments belonging to other sectors (52.7 per cent versus 47.6 per cent). This can be derived from Figure 6.2, which also gives a breakdown according to the different size categories distinguished in the EMERGENCE survey analysis:

In line with our expectations, the picture within the knowledge sector is quite different from the general one. As opposed to the situation in other sectors, in the knowledge sector, the frequency of observing eWork does not increase nicely with the size of the establishment. Whereas there is a significant positive relation between establishment size and the practice of eWork in other sectors, we find no such relationship in the knowledge sector. This allows us to support hypothesis 2:

Hypothesis 2: When looking at the knowledge sector only, company size does not have a significant impact on the frequency of eWork.

[1] The EMERGENCE operationalisation of the 'knowledge sector' has been discussed in the footnote on page 13. The list of NACE categories under investigation can be found in Appendix 1.

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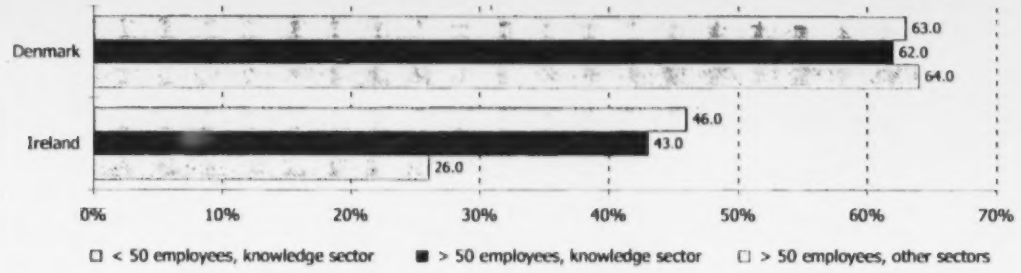
Figure 6.3: eWork in Ireland and Denmark (% eWork in the knowledge sector)



Source: EMERGENCE European Employer Survey 2000 (n = 7,305) + Danish micro-firm survey 2001 (n = 108) + Irish micro-firm survey 2001 (n = 100). Weighted figures.

SMEs in the knowledge sector do not lag behind large establishments in the field of eWork practice. In fact, although the difference is not significant, we even find the highest eWork scores in the smallest establishments of the knowledge sector (54.1 per cent). In addition to this finding from the overall EMERGENCE survey (covering establishments employing over 50 employees only), we can refer to some supplementary results from the micro-firm surveys in Denmark and Ireland (covering establishments employing less than 50 employees in the knowledge sector). As can be derived from Figure 6.3, the micro-firms of the Danish and Irish knowledge sector practice eWork a little more frequently than their larger counterparts in the knowledge sector, but once again, the difference is not very substantial. Whereas all establishments in Denmark make considerable use of eWork, large Irish establishments not belonging to the knowledge sector seriously lag behind.

In brief, our empirical data support the idea of heterogeneity of the group of companies commonly put under the same denominator of SMEs. When looking at the small group of SMEs belonging to the knowledge sector, we do not find inferior eWork scores. The entire group of SMEs on the other hand, including the ones operating in a medium to low-tech environment, scores significantly lower than large establishments in the field of practising eWork. However, we had good reasons to assume that this 'lead position' of large establishments is dependent on the type of eWork. We now test the hypotheses formulated in this respect in the previous chapter (hypotheses 3 to 5).

6.2 Other types of eWork in SMEs?

In this paragraph, we first limit ourselves to the results of the big EMERGENCE survey (covering establishment employing over 50 employees only). The discussion of the results from the additional micro-business surveys in Denmark and Ireland will be presented later on.

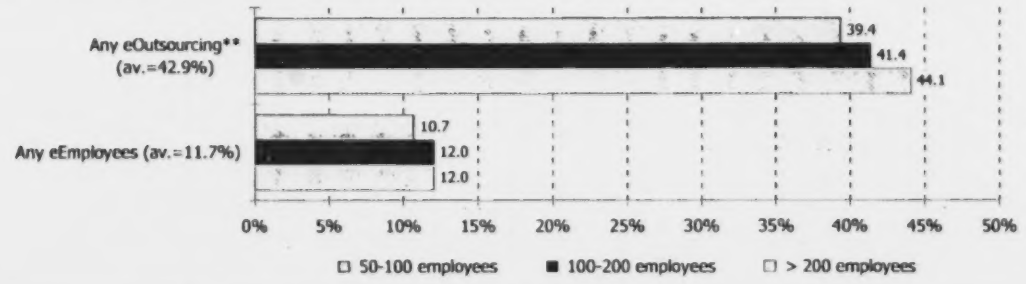
6.2.1 More eEmployees than eOutsourcing in SMEs?

eWork can either be carried out internally, by a company's own employees, or it can be outsourced. In general, the largest proportion of eWork involves outsourcing: whereas 43 per cent of all European establishments with more than 50 employees use a form of eOutsourcing (outsourcing using a telecommunications link to import business services from a subcontractor), only 12 per cent have eWork carried out by employees (Huws and O'Regan, 2001).

As can be seen in Figure 6.4, in all size categories it is far more common to organise eOutsourcing rather than to work with so-called eEmployees. This is also the case for the smallest establishments under study (50 to 100 employees), which we assumed to be more reluctant to engage in outsourcing, basically because of the fear of losing independence (*cf.* section 4.2.1). In absolute terms, small establishments also make much more use of eOutsourcing rather than eEmployees (39.4 per cent versus 10.7 per cent). A possible explanation for this observation could be the lack of internal economies of scale, motivating SMEs to outsource information activities. Small establishments, as well as establishments of any other size having information activities appropriate to be executed remotely, might simply prefer externalisation to being saddled with the organisational implications of in-house eWork. The observation of high overall levels of eOutsourcing, finally, is also in line with the idea of reduced costs of market transactions, making markets more transparent thereby stimulating outsourcing (*cf.* literature survey).

The observation that establishments prefer eOutsourcing to eEmployees, regardless of the number of employees, does not mean we have to reject our third hypothesis, which was formulated in relative terms. Figure 6.4 shows that the size of the establishment has a significant impact on the likelihood of observing eOutsourcing, but not of observing eEmployees. Compared to big establishments, small and medium-sized ones do not score significantly lower in the field of employing eEmployees, but they do in the field of practising eOutsourcing

Figure 6.4: eOutsourcing and eEmployees by size (%)



Source: EMERGENCE European Employer Survey 2000 (n = 7,305). Weighted figures.

(as they did in the field of eWork as a whole). In other words, the arrears of SMEs in the field of practising eWork can fully be attributed to inferior eOutsourcing scores. The empirical results of the overall EMERGENCE employer survey therefore give support to the following hypothesis:

Hypothesis 3: In relative terms, SMEs make more use of eEmployees rather than eOutsourcing.

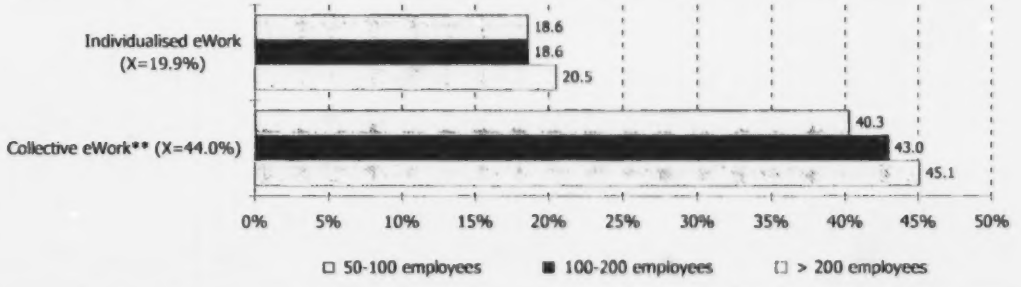
6.2.2 More individualised than collective forms of eWork in SMEs?

As well as a legal distinction (outsourcing versus in-house eWork), a distinction can be made on the basis of the scope and practical organisation of the remote activities: is the work carried out by a group of workers on shared premises, or by individuals acting in isolation away from traditional office premises? In general, collective forms of eWork on shared office premises are far more common than individualised forms away from the office (44 per cent versus 19.9 per cent). This can be derived from Figure 6.5, which also presents a further breakdown of both types of eWork on the basis of our three size categories:

The interpretation here is completely analogous to the one in the previous figure. Collective forms of eWork appear to be most common in all size categories under study, also in the category of small establishments, which we assumed to practice collective eWork less often simply for reasons of scale and size (*cf.* section 4.2.1). In absolute terms, small establishments too make much more use of collective rather than individualised eWork (40.3 per cent versus 18.6 per cent). This might, at least partly, be explained by the fact that our 'small' establishments are still employing over 50 employees and therefore not deviating that much from medium-sized and even large establishments.

However, Figure 6.5 also shows that the number of employees impacts differently on the likelihood of practising individualised and collective forms of eWork. As opposed to the collective forms

Figure 6.5: Individualised versus collective forms of eWork by size (%)



Source: EMERGENCE European Employer Survey 2000 (n = 7,305). Weighted figures.

of eWork, establishments employing up to 200 employees do not score significantly worse in the field of individualised eWork. Although it must be pointed out that the use of collective forms of eWork still outweighs the use of individual forms, smaller establishments can therefore be said to be distinguished by a greater propensity to use individualised eWork. This is in line with hypothesis 4:

Hypothesis 4: In relative terms, SMEs make more use of individualised rather than collective forms of eWork.

6.2.3 Concrete eWork types

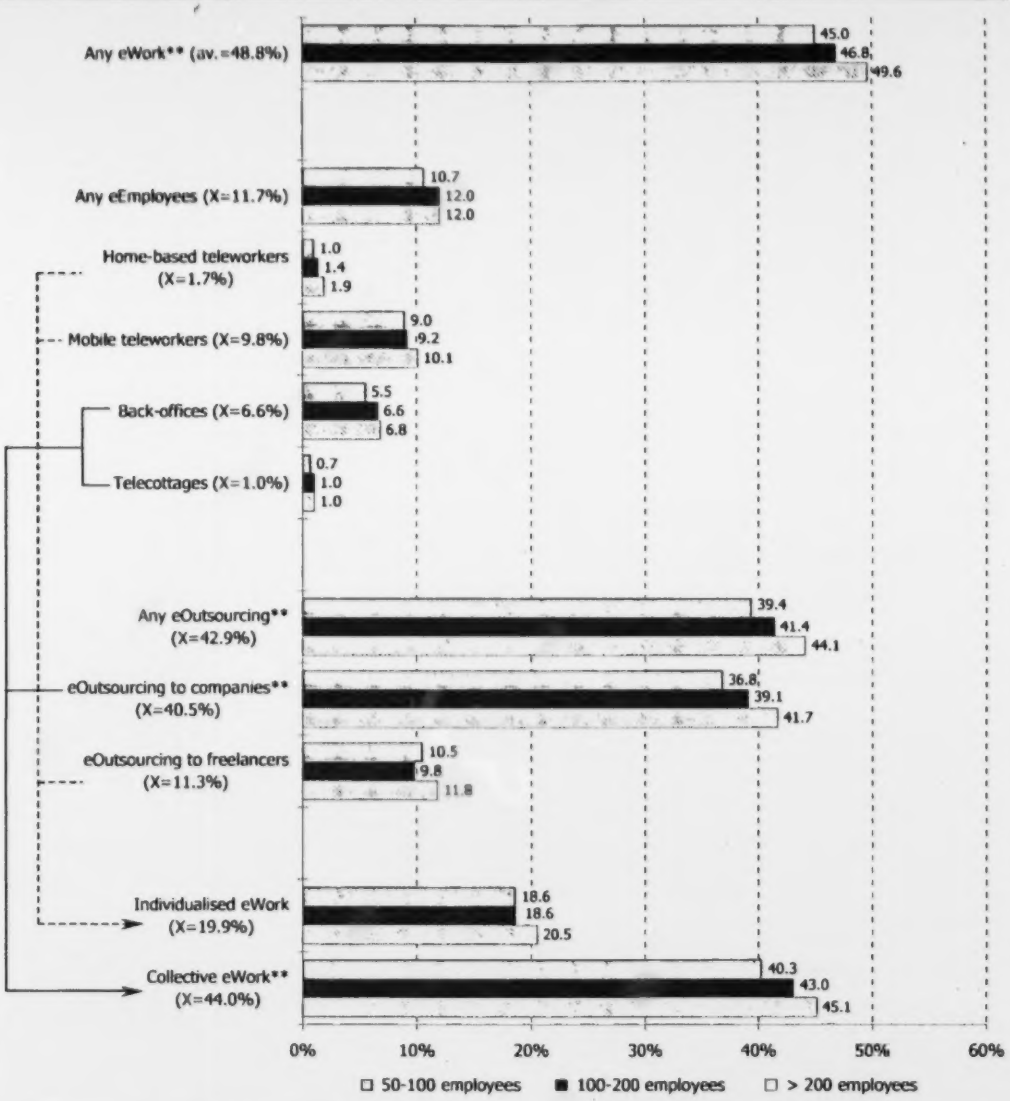
Based on the two dimensions discussed above, a typology of different forms of eWork has been constructed (*cf.* Figure 1). Figure 6.6, below, compares the frequency of observing each type of eWork in the three size categories under investigation. The Figure repeats the aggregate variables presented so far (*eg*, 'any eWork', 'any eEmployees'), thereby giving a full picture of eWork practices in European establishments employing over 50 employees.

In absolute terms, the number of employees does not impact on the different eWork types very much. This is a first important conclusion that can be drawn from Figure 6.6. Regardless of the size category under investigation, outsourcing work to other companies by means of an ICT link is the most popular form of organising eWork. eOutsourcing to companies is followed, at a safe distance, by outsourcing eWork to freelancers (so-called 'eLancers') and working with mobile teleworkers (employees working nomadically from a variety of different locations, for all or part of the working week, whilst keeping in touch by means of ICTs). Home-based teleworking and making use of employees in telecottages or other remote third-party premises appear to be the least common forms of eWork. Once again, this is the case for all the three size categories under investigation. Apparently, the decision-making process and choice between the different types of eWork is based upon similar considerations, regardless of the number of employees. This might, at least partly, be explained by the fact that very small firms have been excluded from the survey.[1]

Relative to large companies, small firms score especially weakly in the field of 'any eOutsourcing' and 'collective eWork'. The number of employees exerts a significant influence on both these variables and this is also the case for the combination of eOutsourcing and collective eWork, *ie* eOutsourcing to companies. In fact, eOutsourcing to companies appears to be the only concrete

[1] For results from the micro-business surveys in the Irish and Danish knowledge sector, see section 6.3.

Figure 6.6: eWork by type and size (%)



Source: EMERGENCE European Employer Survey 2000 (n = 7,305). Weighted figures.

type of eWork whose frequency is significantly influenced by the number of employees. For eOutsourcing to freelancers, the relationship with size is not so clear and the impact of size not significant. This observation is more or less in line with the second part of our fifth hypothesis:

> **Hypothesis 5:** In relative terms, SMEs make most use of telehome-workers and mobile teleworkers, and least use of eOutsourcing to companies.

However, the data do not entirely support the first part of this hypothesis. In relative terms, SMEs are not making more use of the individualised forms of employing eEmployees (*ie* home-based and mobile teleworkers) than of the collective forms (ie back offices and telecottages). The size of an establishment does not impact significantly on any form of eEmployment, but for the category of telehomeworkers, this is almost the case ($p = 0.059$). Only one per cent of the small establishments (50 to 100 employees) make use of home-based teleworking, whereas almost two per cent of the large establishments (>200 employees) do so. On the basis of this information, seeming to suggest that home-based teleworking is subject to a critical minimal size and economies of scale, we cannot give support to the part of hypothesis 5 stating that SMEs score relatively well in the field employing telehomeworkers. Consequently, hypothesis 5 as a whole has to be rejected too.[1]

Before empirically testing the remaining 'demand-side' hypotheses on the basis of the overall EMERGENCE survey (*ie* hypothesis 6 and 7), we would like to focus on the knowledge sector and present some illustrative findings from the additional micro-firm surveys in Denmark and Ireland. For an introductory elaboration on the differences in eWork practice between the knowledge sector and other sectors, we refer to Appendix 2.

6.3 SMEs in the Irish and Danish knowledge sector[2]

The supplementary micro-firm surveys contain data from establishments with fewer than 50 employees, thereby casting a light on the eWork practices in very small establishments. The following two figures focus on the Irish and the Danish knowledge sectors and compare the eWork practices of micro-firms to establishments employing more than 50 employees:

When looking at in-house eWork first, it is becoming clear that knowledge establishments employing over 50 employees, be they Irish or Danish ones, are more likely to use multi-locational eWork than their smaller counterparts. Alternatively, the largest

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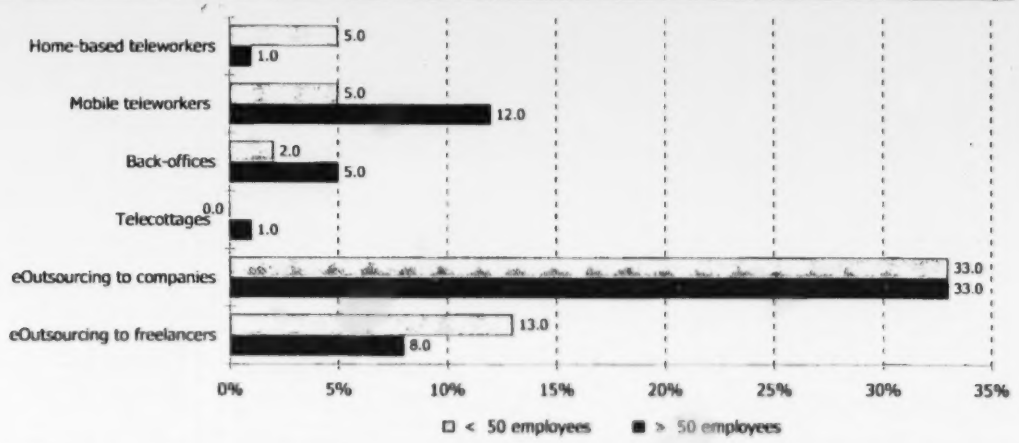
1 It should be kept in mind that the question *whether* an establishment is making use of home-based teleworkers or not, is saying nothing about the *number* of employees or the *share* of an establishment's total employment actually working from home. The same number of telehomeworkers will logically have a larger impact in small as opposed to very large establishments.

2 Because of the small amount of observations (n = 108 for the Danish micro-firm survey and n = 100 for the Irish micro-firm survey), the results should be interpreted with the necessary caution. They are more illustrative than truly representative, because they originate from two countries only. Country-specific elements, which we assume to be averaged out when analysing data at the European level, significantly bias the results presented in this paragraph.

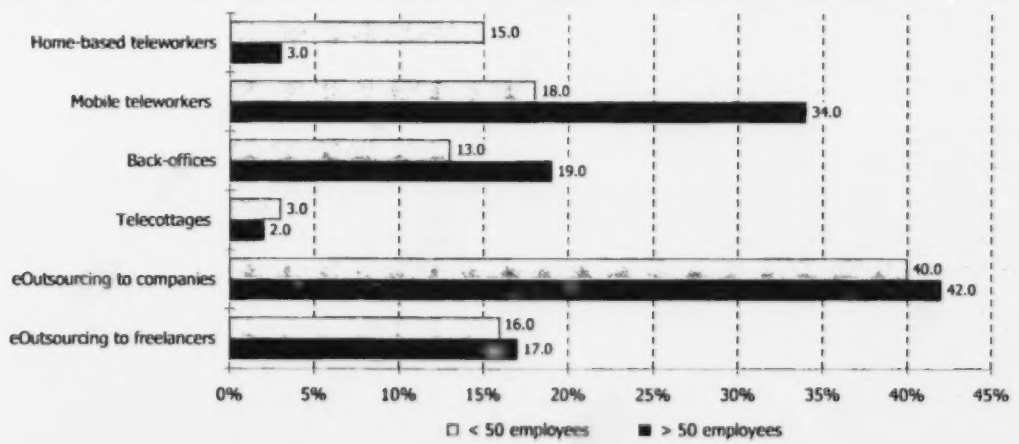
Figure 6.7: eWork by size in the knowledge sector: the case of Ireland (% of establishments)



Source: EMERGENCE European Employer Survey 2000 (n = 7,305) + Irish micro-firm survey 2001 (n = 100). Weighted figures.

proportion of home-based teleworkers can be found in micro-firms. There are several possible explanations for this size-related difference: 'In some cases, the small establishments in question may be micro-enterprises run from the homes of their proprietors or by networks of homeworkers; in other cases the use of homeworkers may be an effect of the relative precariousness of small enterprises which cannot afford the extra office space or the additional equipment required to give workers a genuine choice of location. It could also be that smaller establishments lack a specialist HR officer who is aware of the advantages of multi-locational working and their workers may be managed in a more ad hoc way, without formal negotiation' (Bates *et al.* 2002).

Figure 6.8: eWork by size in the knowledge sector: the case of Denmark (% of establishments)



Source: EMERGENCE European Employer Survey 2000 (n = 7,305) + Danish micro-firm survey 2001 (n = 108). Weighted figures.

When turning to the use of remote back offices, in Ireland as well as Denmark, we see higher percentages in establishments employing over 50 employees. The use of telecottages, the other collective form of in-house eWork, is clearly negligible in Ireland. Danish establishments in the knowledge sector more often make use of telecottages. This may reflect some kind of niche marketing by telecottages or telecentres or, more likely, the typical skill patterns and technology requirements of the knowledge industries which lend themselves particularly well to remote work (Huws *et al.*, 2002).

We now turn our attention to outsourced forms of eWork. In general, small firms in the knowledge sector make considerable use of outsourcing, by using a telecommunications link to import business services from subcontractors. According to Bates *et al.*, this might, in part, reflect a big need among the smallest establishments to buy in resources or expertise from external sources because they lack the scale of demand which would make it economic to have a permanent in-house solution.

In general, the number of employees does not impact on the use of outsourcing strategies as much as on the use of in-house forms of eWork. This is certainly the case for the Danish knowledge sector, where micro-firms and establishments employing over 50 employees engage in outsourcing, be it to companies or to freelancers, almost as frequently. Micro-firms in the Irish knowledge sector are more likely to eOutsource to individual freelancers than to their larger counterparts. Because of the small scale of activities, the services of a freelancer might be a cheaper option, or give a small firm more flexibility than calling upon the eServices of large, service-providing companies. The observation that micro-firms are making considerable use of remote eLancers, is also in line with the idea of small companies networking with each other and using Internet and enterprise networking technology for business co-operation (*cf.* literature survey). For additional information on eWork practices in Ireland and Denmark, including the necessary contextual background information, we refer to the respective country reports.[1]

6.4 Locations involved in remote work and reasons for their choice

After elaborating on the Danish and Irish knowledge sector, we would like to return to the overall EMERGENCE survey, and use the data set to empirically test our last two demand-side hypotheses, starting with hypothesis 6.

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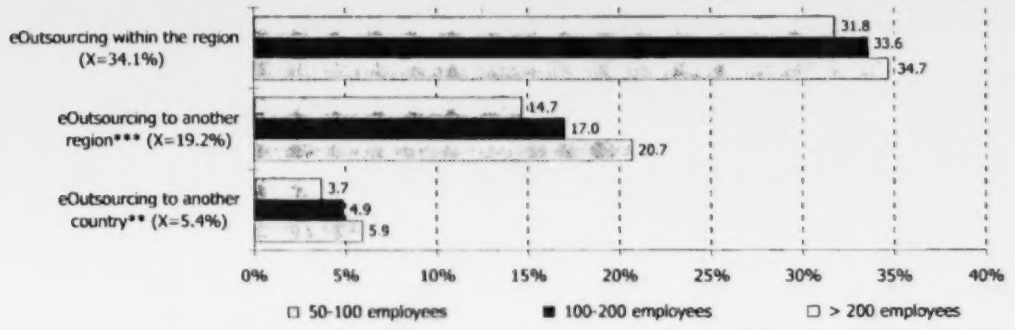
[1] Bates P, Bertin I, Huws U (2002), *e-Work in Ireland*, DETE Ireland, Cork. Huws U, Bates P, Millard J and O'Regan S (2002), *eWork in Denmark*, IES Report 394

Figure 6.9: The geographical scope eOutsourcing by size (% of establishments)



Source: EMERGENCE European Employer Survey 2000 (n = 7,305). Weighted figures.

6.4.1 Smaller geographical scope of remote eWork in SMEs?

In general, the geographical scope of outsourcing information activities by means of an ICT link remains fairly modest. Far more companies prefer the outsourced work to be delivered by a supplier in their own region, rather than opting for a service supplier located in another region of the same country and certainly another country (Huws and O'Regan, 2001). Figure 6.9 compares the geographical scope of eOutsourcing in small, medium-sized and large establishments.

A limited geographical scope of eOutsourcing is certainly not a prerogative of small establishments. The biggest establishments too, prefer eOutsourcing within their own region to eWork being delivered from another region, and certainly from abroad. On the other hand, the 'eOutsourcing-behaviour' of small establishments deviates from that of medium-sized and large establishments. The frequency of the three types of eOutsourcing increases with size (higher percentages in bigger establishments) but the difference is only significant for eOutsourcing to another region or country, and not for eOutsourcing within the 'home' region. The evidence is that the geographical scope of eWork is larger in big companies, and this is in line with our 6th hypothesis:

Hypothesis 6: The geographical scope of eWork and the delocalisation of information activities is smaller in SMEs than in big companies.

The observation that small establishments score relatively high on nearby relocations can be explained by the fact that many SMEs are still local players, mainly operating in domestic markets. That they score especially low on international relocations can be explained by the fact that many SMEs see themselves confronted by many barriers to internationalisation (see section 4.3.1).

eWork and the delocalisation of information activities cannot only take place by means of outsourcing, but also via in-house solutions.

A full assessment of hypothesis 6, therefore, requires an investigation of the geographical scope of the various forms of eWork carried out by the establishment's own employees. This has been done in Appendix 3. Because the majority of eWork does not involve direct employees, but some form of outsourcing, the inclusion of in-house eWork to obtain the geographical scope of 'any relocation' or 'any remote eWork' does not deviate significantly from Figure 6.9.[1] The interpretation is also analogous: small establishments score significantly weaker in the field of relocation to another region or country, but not within the own region. In relative terms, our data therefore allow us to give support to hypothesis 6 stating that the geographical scope of eWork is smaller in SMEs than in big companies.

6.4.2 Other reasons for choosing a remote location and/or eService supplier?

Where a respondent mentioned the location of a back-office, a telecottage or a remote service supplier, additional questions were asked concerning the concrete reason for choosing this location and/or subcontractor. An analysis of these reasons allows us to test hypothesis 7:

> **Hypothesis 7:** The reasons for choosing a remote location and/or eService supplier vary significantly with the size of a company. In relative terms, cost considerations and informal contacts play a more important role in the decision-making process of SMEs.

In general, the results presented in Figure 6.10 do not support hypothesis 7. Small, medium-sized and large establishments certainly differ in their reasons for choosing a remote location and/or remote service supplier, but the general picture of the three size categories does not deviate that much. More or less the same reasons appear to be very important (*eg* technical expertise and right software), important (*eg* good reputation, market leaders and reliability, quality, creativity) or not important at all (*eg* difference in time zone and public grants, tax advantages) regardless of the size of the establishment relocating eWork.

Because budgetary restraints form a significant barrier for many SMEs, we hypothesised that cost considerations play a more important role in the decision making processes of small companies. However, contrary to our expectations, the cost reason seems to be most important in establishments employing over 200 employees – another reason for rejecting hypothesis 7. Whereas 'low cost/most competitive tender' is the second most important motive for choosing a remote location and/or service supplier in big establishments, the cost motive only occupies the sixth place in small establishments. Several factors suggest themselves. The first

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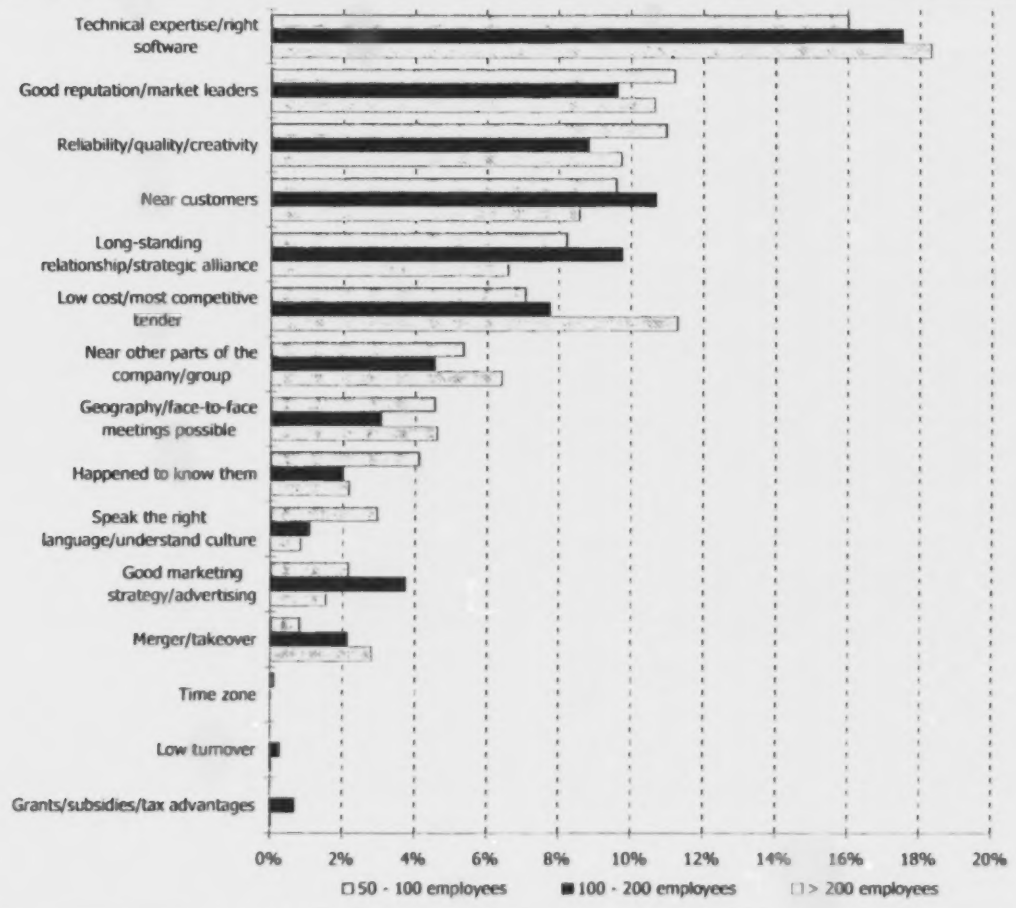
[1] *Cf.* Figure A3.3 in Appendix 3

Figure 6.10: Reasons for choosing a remote location and/or service supplier by size (%)



Source: EMERGENCE European Employer Survey 2000 (n = 7,305). Weighted figures. Remark: percentages are based on total number of reasons, not establishments

is that cost considerations play a more important role in establishments with fewer than 50 employees. Because of their size, these establishments would not have been picked up in our survey. A second possible explanation is that the relocation of eWork by small companies is driven not only by cost considerations, but also by, for instance, difficulties in recruiting qualified staff and skilled workers, the lack of expertise, and the lack of scale to make it economic to have a permanent in-house solution. These are reasons that are less likely to play a role in big establishments, that can put more emphasis on pure cost savings. Another possibility is that big establishments simply organise an official call for tender more often than small ones, which tend to choose their remote locations and/or service suppliers in a more informal way.

In line with this latter explanation, the reason 'we happened to know them' appears to be twice as important in small establishments as in medium-sized and large establishments. In

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other words, in contrast with the assumption of cost considerations, the assumption of informal contacts being more important in small companies, is supported by the data of the EMERGENCE survey. This is, at least partly, related to the idea of SMEs networking among each other in order to get access to new markets and overcome the deficiencies of operating in isolation. Besides informal contacts, other 'soft' reasons appear to be more important in the decision-making processes of small establishments too, eg, speaking the right language, understanding the culture, long-standing relationships, strategic partnerships, *etc.* In brief, it looks as if SMEs reorganise themselves in a less formalised and more organic way than big establishments.

6.5 eWork and the demand for information activities: summary

- In general, the size of an establishment impacts on the frequency of observing eWork in a significant and straightforward way: small establishments practice eWork somewhat less often than medium-sized, and markedly less than, large establishments.
- This is all the more the case for establishments not belonging to the knowledge sector. Within the knowledge sector, the size of an establishment does not play such an important role. In other words, the group of companies commonly categorised as SMEs is a very heterogeneous one.
- Regardless of the size of establishments, the largest proportion of eWork involves outsourcing. In relative terms however, small establishments make considerable use of in-house forms of eWork.
- Regardless of the size of establishments, the largest proportion of eWork involves groups of workers on shared premises. In relative terms however, small establishments make considerable use of individualised form of eWork.
- Regardless of the size of establishments, eOutsourcing to companies is the most popular form eWork, followed at a safe distance, by the use of so-called eLancers and mobile teleworkers, whereas the use of home-based teleworkers and telecottages is far from widespread. Relative to big establishments, small ones are considerably less likely to make use of eOutsourcing to third party companies.
- Establishments in the knowledge sector practice eWork more often than other establishments. They do not outsource information work to third party companies more often, but they make far more use of eLancers and all types of eEmployees.

- Within the knowledge sector, size does not significantly impact on the frequency of practising any kind of eWork – insofar as establishments employ over 50 employees.
- Micro-firms (<50 employees) in the Irish and Danish knowledge sector, seem to perform particularly well in the field of employing home-based teleworkers and, in the case of Ireland, also eOutsourcing to freelancers. On the other hand, they make less use of mobile teleworkers and back offices than their counterparts employing more than 50 employees.
- Regardless of the size of establishments, relocations within the region are far more popular than relocations to another region, let alone to another country. In relative terms, the geographical scope of eWork-relocation is somewhat smaller in small, as opposed to large, establishments.
- The size of establishments does not impact greatly on the reasons for choosing a remote location and/or eService supplier. Technical expertise is the overall number one reason. Informal contacts and networking play an especially important role in the decision-making processes of small establishments.

7. The Supply Side of eWork and the Trade in Information Activities

Chapter 6 of this report was entirely devoted to the demand side of information activities and eWork. By this we mean companies having a clear need of, or demand for, telemediated work for their own functioning. This demand for eWork can either be fulfilled by means of in-house solutions or by means of outsourcing. Every outsourcing relationship, of course, involves two parties. In this chapter, we focus on the supply side of outsourcing relationships, *ie* companies supplying telemediated information activities to third party companies – their business clients.

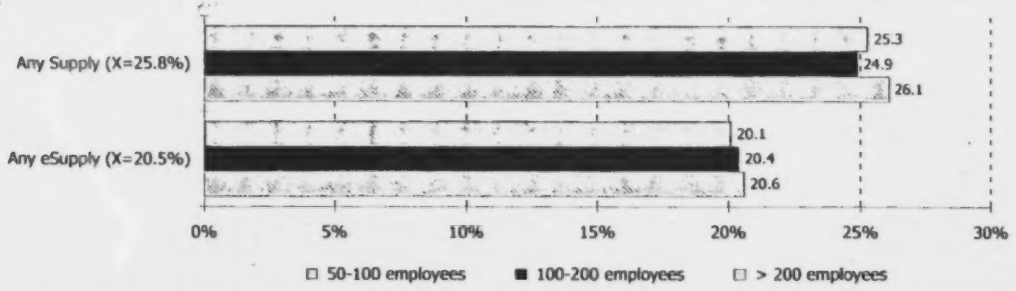
In general, we expect SMEs to play a crucial role on the supply side of the new economy and the trade in information activities. We expect this because of; the low degree of capital intensity of many eBusinesses, because of typical assets such as flexibility and innovativeness, because of the virtues of engaging in electronic networking, because the trend of increased outsourcing is generating new business opportunities for SMEs, *etc.* (*cf.* literature survey). In this chapter, we test this idea on the basis of the empirical results from the EMERGENCE surveys.

7.1 Are SMEs important suppliers of eServices?

As can be seen from Figure 7.1, in all, one in every four European establishments is engaged in supplying information activities such as customer service, software development, accounting and finance, *etc.* to third party companies. Because we are especially interested in the supply of telemediated services, additional questions have been asked as to whether a telecommunications link is used to receive and transmit work to business clients. Overall, one establishment in five is involved in supplying information-based services using new technologies – so-called eSupply.

Figure 7.1 clearly shows that the size of establishments does not impact on the likelihood of supplying information-based services, with or without a telecom link. SMEs are certainly not scoring better than large establishments in the field of eSupply. On the other hand, small establishments do not score worse either. This contrasts strongly with the demand side of information services, where we did observe lower scores for small establishments in the

Figure 7.1: Supply and eSupply by size (% of establishments)



Source: EMERGENCE European Employer Survey 2000 (n = 7,305). Weighted figures.

field of eWork, and especially of eOutsourcing (*cf.* Chapter 6). Although small establishments have a lower demand for telemediated services being delivered by subcontractors, in line with our expectations, they do not offer these services to third party companies less frequently than large establishments. The empirical data from the overall EMERGENCE survey therefore allow us to support the following hypothesis:

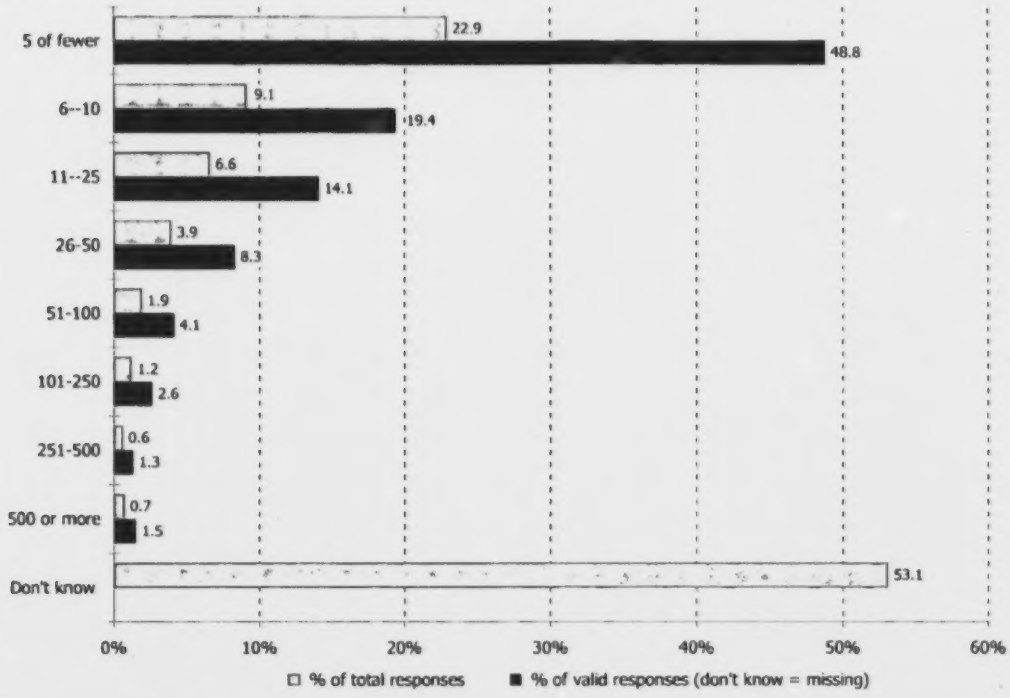
Hypothesis 8: In relative terms, SMEs are more important on the supply side of the trade in information activities than the demand side.

The question whether SMEs play an important role at the supply-side of the trade in information services has just been investigated directly, *ie* by calculating the number of small establishments involved in the supply of eWork. The same question can also be explored indirectly by further analysing the demand side, in particular by looking at the size of the so-called destination, in cases where an establishment is outsourcing eWork. Indeed, every time an establishment was found to be outsourcing information-based work for a specific business function, additional questions were asked concerning the number of workers involved in this work. This amount can be considered as a proxy variable for the size of companies supplying eWork.[1] Figure 7.2 presents the empirical results, *ie* the number of workers involved at the remote location in cases of eOutsourcing.

Outsourcing is generally a more arms-length relationship than in-house remote employment, so it is not surprising that over half the establishments using eOutsourcing did not know how many workers were involved at the remote location (Huws and O'Regan, 2001). In Figure 7.2, we present the overall percentages as well as the ones in which the 'don't know' category is excluded.

[1] The number of workers involved in delivering eWork to an outsourcing company is only a very rough estimation of the actual size of the service supplier, mainly because the destination company in question can supply the same kind of information work to many different companies – its business clients.

Figure 7.2: Number of workers involved in eOutsourcing (% of responses)



Source: EMERGENCE European Employer Survey 2000 (n = 7,305). Weighted figures.

In general, most eOutsourcing involves very small groups of workers at the remote location. In 22.9 per cent of all eOutsourcing cases (and in almost half the cases where numbers are known) five workers or fewer are involved. It should be noted that these cases include outsourcing to individual freelancers, but nevertheless the data underline the importance of individual entrepreneurs and micro-businesses in the supply of eServices. In a further 19.6 per cent of cases (or 41.8 per cent when excluding the 'don't know' category), fewer than 50 workers were involved. The proportions employed in larger numbers are extremely small by comparison. It must be borne in mind that numbers are more likely to be known when they are small, and it is quite possible that a substantial proportion of cases where numbers were not known involved larger numbers of workers location (Huws and O'Regan, 2001).

However, notwithstanding this nuance, the empirical data seem to support the idea of small companies playing an important role on the supply side of the trade in information activities. This is in line with our assumption, one of the underlying reasons simply being the increased outsourcing of information activities by bigger companies resulting in new business opportunities for SMEs specialising in these fields.

7.2 Most eSupply in SMEs belonging to the knowledge sector?

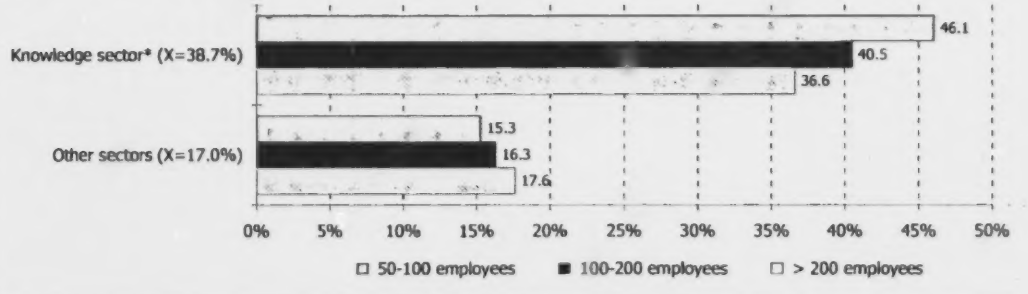
Because the typical weaknesses of SMEs (*eg* financial problems because of high startup and exploitation costs) are becoming less important in the knowledge sector, and because the typical strengths (*eg* flexibility, creativity and innovativeness) are becoming all the more important, we hypothesised 'knowledge-SMEs' to be extremely important suppliers of eServices, even more so than big companies.

We test this hypothesis by means of first, the overall EMERGENCE survey, and second, the micro-firm surveys from Ireland and Denmark.

Establishments in the knowledge sector clearly supply eServices more often than other establishments - the percentage of eSupply even being more than twice as high (38.7 per cent versus 17.0 per cent). This is the first conclusion that can be derived from Figure 7.3. When looking at different size categories, the picture within the knowledge sector is quite different from that in other sectors. Within the knowledge sector, the frequency of observing eSupply varies inversely with the size of the establishment. For establishments not belonging to the knowledge sector, this is not the case. Small establishments in the knowledge sector are three times as likely to be involved in the supply of telemediated services as their counterparts from other sectors (46.1 per cent versus 15.3 per cent). In line with hypothesis 9, small establishments in the knowledge sector are very important suppliers of eServices, more important than big establishments in the knowledge sector.

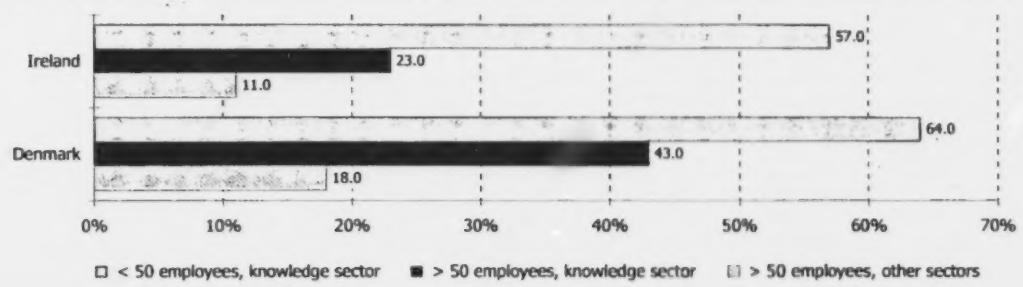
We can now investigate whether the general pattern of finding most eSupply in the smallest establishments from the knowledge sector is still valid when including establishments employing under 50 employees. We do so on the basis of additional information from the Irish and Danish micro-firm surveys in the knowledge sector (Figure 7.4).

Figure 7.3: eSupply by size: the knowledge sector versus other sectors (% eSupply)



Source: EMERGENCE European Employer Survey 2000 (n = 7,305). Weighted figures.

Figure 7.4: eSupply by sector and size: the case of Ireland and Denmark (% eSupply)[1]



Source: EMERGENCE European Employer Survey 2000 (n = 7,305) + Danish micro-firm survey 2001 (n = 108) + Irish micro-firm survey 2001 (n = 100). Weighted figures.

As can be seen from Figure 7.4, within the Irish and Danish knowledge sector, micro-establishments (<50 employees, knowledge sector) are much more frequently involved in the supply of telemediated services than larger establishments (>50 employees, knowledge sector), which in their turn have higher eSupply-scores than their counterparts from other sectors (>50 employees, other sectors).

These data prove the crucial role micro-firms from the knowledge sector play in the new economy, in particular on the supply side of the trade in information services and remote eWork.[2] Supplementary surveys of very small firms in other countries will allow us to discover whether these findings from Denmark and Ireland can be generalised or not.

In brief, the empirical data from both the overall EMERGENCE survey and the micro-firm surveys in the Danish and Irish knowledge sector, allow us to support hypothesis 9:

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1 Ideally, the establishments in the Irish and Danish knowledge sector employing over 50 employees should further be broken down on the basis of the three major size categories used in this report (50-100, 100-200 and >200 employees). However, the small amount of observations does not allow us to do this in a statistically reliable way.

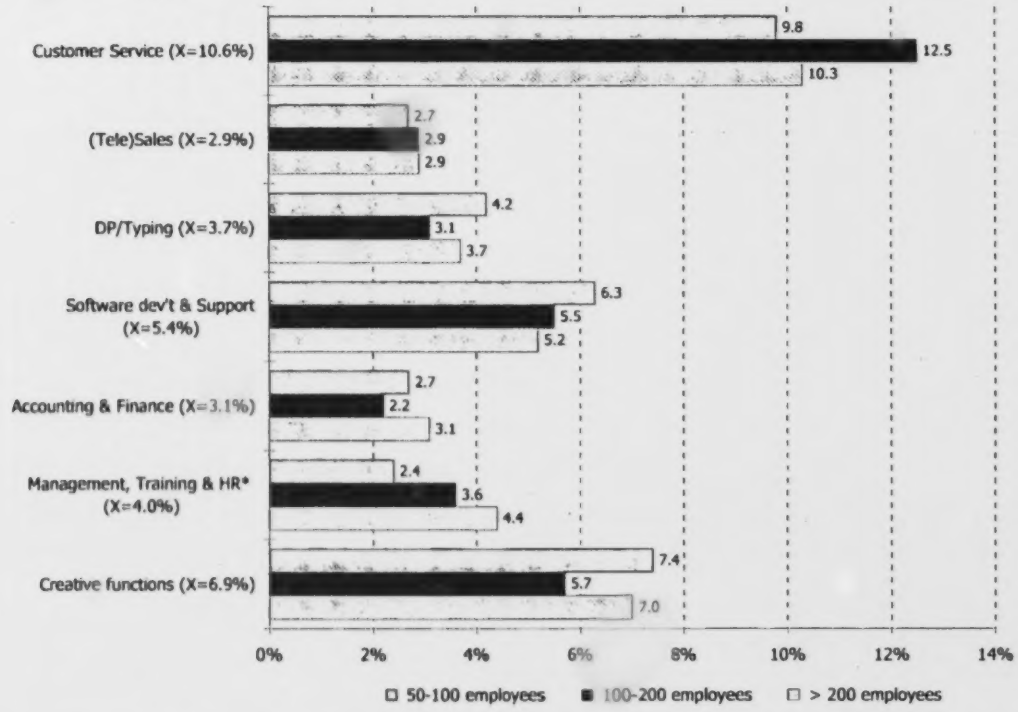
2 We want to remark here that the observed relationship between establishment size and eSupply in knowledge sector, in combination with the lack of such a relationship when including all sectors, can be disturbed by intermediate variables not included in the analysis. The 'age' of an establishment, *ie* the amount of years since its foundation, is an example of an independent variable possibly interfering with size. SMEs can be important players in the knowledge sector because of intrinsic virtues such as flexibility, innovativity, etc, but another reason might be that the average company in the knowledge sector is considerably younger than overall average and that young companies are more likely to be small than their older counterparts. The future will have to reveal whether the SMEs currently doing well in the new economy and the supply of telemediated business services will be characterised by an increase of scale or not.

Hypothesis 9: When looking at the knowledge sector only, SMEs are more often supplying telemediated information activities than big companies.

7.3 Do SMEs supply other information-based services?

The EMERGENCE questionnaire not only investigated whether a company is involved in the supply of information-based services, but also which services are being supplied to third party companies. The analysis was based on seven generic business functions. The business function most likely to be supplied by means of ICT is customer service (10.6 per cent), followed by creative work[1] (6.9 per cent) and software development (5.4 per cent). As can be seen from Figure 7.5, these are the three most commonly supplied business functions in all size categories.

Figure 7.5: eSupply by function and size (% of all establishments)



Source: EMERGENCE European Employer Survey 2000 (n = 7,305). Weighted figures.

Because of the specific assets of flexibility, innovativeness and creativity, we expected small establishments to score relatively well in the field of supplying software development and creative

[1] Creative work is a category which includes design, editorial work, multimedia content generation and other creative and content-generating activities such as R & D.

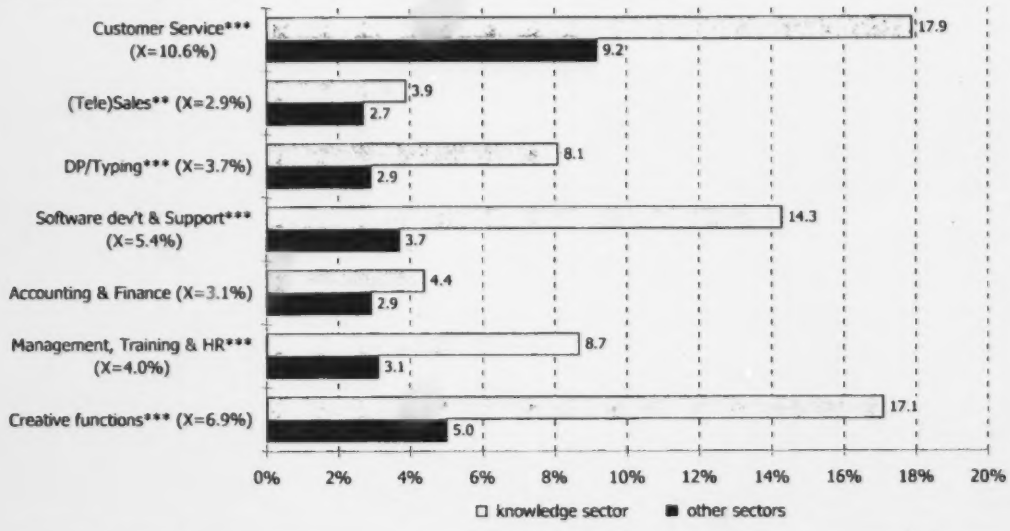
work. Because of the possibility to realise economies of scale, we also expected large establishments to score relatively well in the field of supplying call centre activities such as customer service. This resulted in the following hypothesis:

Hypothesis 10: In relative terms, SMEs score best in the supply of software development and creative work, and worst in the supply of customer service activities.

The empirical results show that small establishments do indeed have the highest eSupply score of the three size categories for the software development and creative work functions, but the difference is not statistically significant. Furthermore, they score relatively high on data processing as well. By analogy, small establishments have the lowest eSupply score of the three size categories for the customer service function, but the difference is not significant either. Furthermore, small establishments have the lowest score for (tele)sales and management/HR, and for the latter function, the difference is statistically significant. Consequently, Figure 7.5 does not allow us to give full support to hypothesis 10, but it does not allow us to entirely reject it either.

Because the number of employees impacts quite differently on companies within the knowledge sector than on those belonging to other sectors (*cf.* Figure 7.3), we will do an additional test of hypothesis 10, for establishments belonging to the knowledge sector only. Before doing so, we present (Figure 7.6) the difference between the knowledge sector and other sectors in the field of supplying our seven generic business functions using new technologies.

Figure 7.6: eSupply by function: knowledge sector versus others sectors (% all establishments)



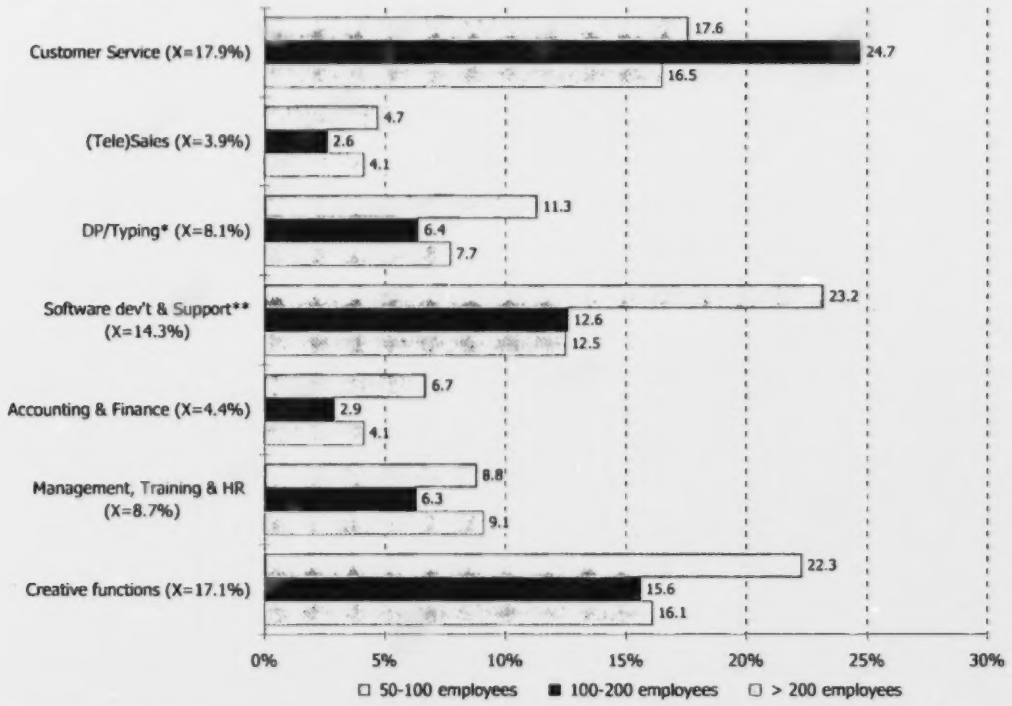
Source: EMERGENCE European Employer Survey 2000 (n = 7,305). Weighted figures.

Not surprisingly, given that they are, by definition, knowledge-intensive, establishments in the knowledge sector outperform other establishments for all the business functions under investigation, with the exception of accounting and financial services, and the difference is very significant. The lead position of the knowledge sector is most pronounced for software development and creative work (for these functions, the frequency of eSupply is more than three times as high in the knowledge sector in comparison with other sectors).

In the Figure 7.7, we combine the two previous Figures and present the frequency of telemediated supply of seven business functions by size in the knowledge sector only.

Small establishments in the knowledge sector are very active in the field of supplying software development and support, as well as design, editorial and creative functions. This is completely in line with the first part of our tenth hypothesis. On the other hand, in relative terms, small establishments are also doing very well in the field of data processing and typing, and, to a lesser extent, in accounting and finance. Overall, our empirical data give partial support to hypothesis ten, either when looking at all establishments, or when limiting ourselves to the knowledge sector.

Figure 7.7: eSupply by function and size in the knowledge sector only



Source: EMERGENCE European Employer Survey 2000 (n = 7,305). Weighted figures.

Figures A4.1 and A4.2 in Appendix 4, show additional micro-firm data from the Danish and Irish knowledge sector. In general, micro-firms in both these countries have succeeded in capturing important segments of the remote information services market. They appear to be particularly important suppliers of software development, creative work, and customer services activities. Irish firms employing up to 50 employees, score considerably higher than their larger counterparts in the knowledge sector. In the Danish knowledge sector, characterised by higher overall frequencies of eSupply, the dominance of micro-firms is less pronounced.

This latter observation draws attention to national differences in the field of supplying telemediated services. These differences will be mapped and further explored in the next chapter. In the remainder of this chapter, we will focus on the geographical scope of eSupply and the reasons for being chosen as an eSupplier. Although we did not formulate any hypotheses in this respect, we briefly present some key results, by analogy with the discussion on the demand side of eWork.

7.4 Where is the work being supplied to and how is a supplier chosen?

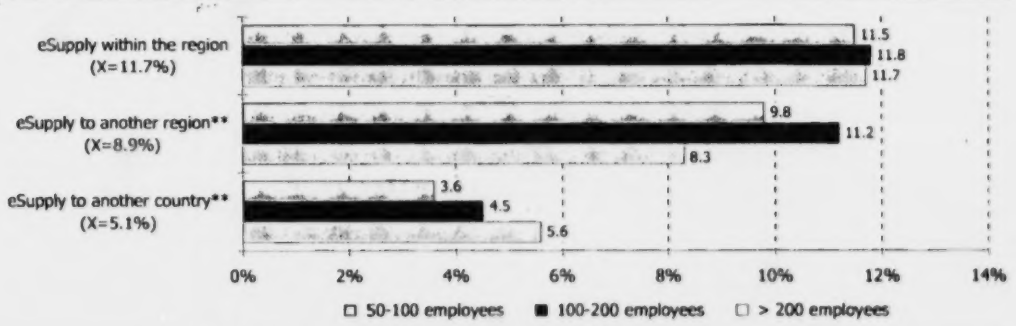
7.4.1 The geographical scope of eSupply

In every case where an establishment supplied information work to a third party company, additional questions were asked concerning the location of the business client in question: is the client located in the same region of the eSupplier, in another region of the same country or in another country?

In line with the demand side for information activities (section 6.4), information work is most frequently supplied to companies within the same region, and least frequently to companies abroad. However, the difference between the proportion of establishments involved in intra-regional and international eSupply (11.7 per cent versus 5.1 per cent; *cf.* Figure 7.8) is considerably smaller than the difference between intra-regional and international eOutsourcing (34.1 per cent versus 5.4 per cent; *cf.* Figure 6.9). In other words, when taking a supply-side perspective, a larger share of information services is exported to foreign companies. A possible explanation for this finding is that a lot of eSupply within the region is conducted by establishments with fewer than 50 employees, which are not picked up in the overall survey.

We now look more closely at the geographical dimension of eSupply in small, medium-sized and large establishments.

Figure 7.8: The geographical scope of eSupply by size (% of all establishments)



Source: EMERGENCE European Employer Survey 2000 (n = 7,305). Weighted figures.

In general, the three different size categories are almost as frequently involved in the supply of telemediated work (*cf.* Figure 7.1) and this is also the case for eSupply within the same region. In contrast with this 'nearby' form of eSupply, the number of employees has a significant impact on delivering eServices more remotely. Whereas medium-sized establishments perform very well in the field of supplying information work to another region of the same country, the chance of being involved in international eSupply is clearly increasing together with the number of employees.

This supply-side information gives additional support to our 6th hypothesis, which states that 'the geographical dimension of the relocation of information activities is smaller in SMEs than in big companies'.

7.4.2 Reasons for choosing a supplier of eServices

eSuppliers were also asked why they thought they had been chosen by their business clients, and the results of this are presented in Figure 7.9. It is interesting to compare these suppliers' views of choice criteria, with those of their customers (presented in Figure 6.10). In general, the supply side mirrors that of the demand side fairly closely, the most important difference between the two being the relatively low importance given to their technical expertise by eService suppliers, and the somewhat lower importance given to proximity to customers.

In line with the reasons for choosing a remote location and/or eService supplier, the reasons for supplying eWork to third party companies do not differ that much between the three size categories. Compared to medium-sized and large establishments, four of the twelve reasons are most frequently mentioned by small suppliers: low cost/most competitive tender, skills/technical expertise/right software, 'we happened to know them' and 'we speak the right language/understand their culture'.

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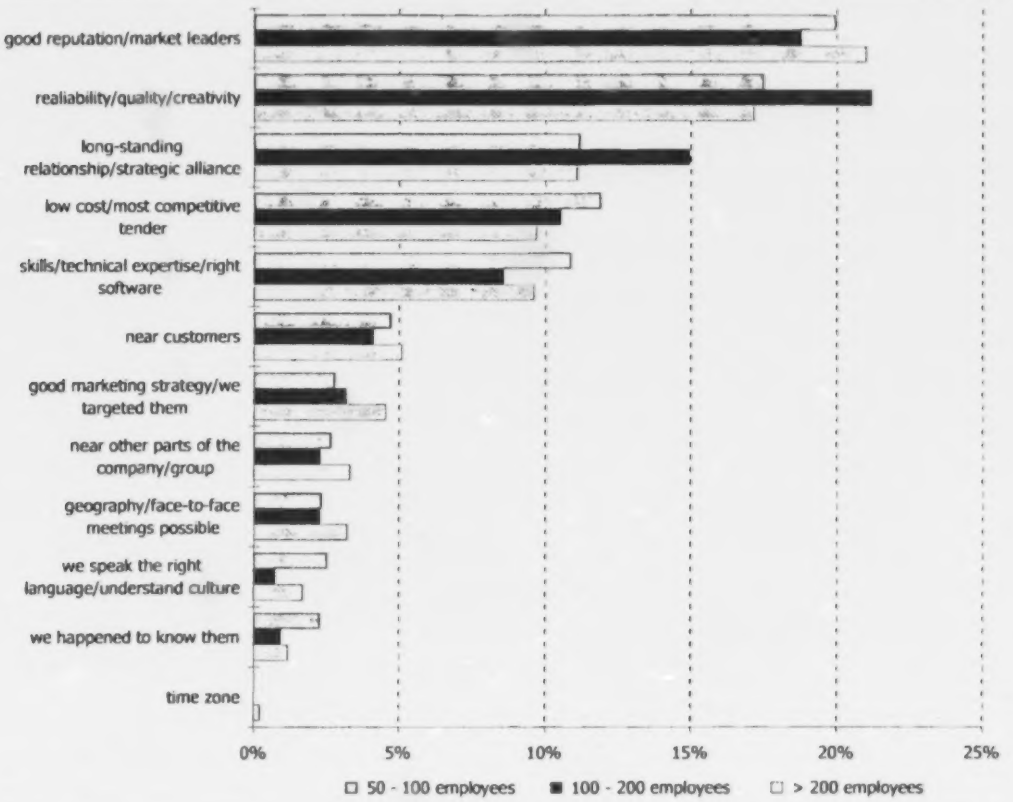
Figure 7.9: Reasons for being chosen as an eService supplier by size



Source: EMERGENCE European Employer Survey 2000 (n = 7,305). Weighted figures. Remark: percentages are based on total number of reasons, not establishments

The higher score on 'we happened to know them' is in line with the analysis of the demand side reasons, and further underlines the importance of informal contacts in the decision-making processes of SMEs. At first sight, the higher score on 'low cost/most competitive tender' is contrasting to the demand side, where cost considerations played the most important role in the largest establishments. On the other hand, it might be a reflection of large, cost-conscious establishments outsourcing a lot of information work to small establishments specialising in this work, and being selected simply because they can supply the work at lower cost. In other words, it might be another proof of the important role that SMEs play in the trade in information activities, and in the new economy as whole.

7.5 A summary of the supply side of eWork and the trade in information activities

- In general, the size of establishments does not impact significantly on the telemediated supply of information-based

services; small establishments do not score better than large ones in the field of eSupply, but they do not score worse either.

- This contrasts strongly with the demand for eWork, where large establishments outperform small ones. Consequently, in relative terms, SMEs are more important on the supply side of the trade in information activities than on the demand side.
- This is all the more the case when limiting ourselves to the knowledge sector. SMEs in the knowledge sector are very important suppliers of telemediated services, and are more important than large establishments in the knowledge sector.
- The importance of SMEs on the supply side of outsourcing relationships is further confirmed when analysing the average number of workers involved at the remote location in cases of outsourcing. The data seem to underline the importance of individual entrepreneurs and micro-businesses in the supply of eServices.
- Regardless of the size of establishments, the business function most likely to be supplied by means of ICT is customer service, followed by creative work and software development.
- Establishments in the knowledge sector outperform other establishments in the field of eSupply, and this is the case for all business functions under investigation.
- Small establishments in the knowledge sector are most active in the field of supplying software development and support, and creative work.
- Regardless of the size of establishments, information services are most frequently supplied to companies in the same region and least frequently to companies abroad. In relative terms, the geographical scope of eSupply is somewhat smaller in small, as opposed to large, establishments.
- Overall, the size of establishments does not impact very much on the reasons for being chosen as an eSupplier. Compared to larger establishments, small ones are more often chosen because of their expertise and cost advantages, and to a lesser extent, because of informal contacts.
- Micro-firms (<50 employees) in the Danish and Irish knowledge sector have succeeded in capturing important segments of the remote information services market. Supplementary surveys in other countries will allow us to answer the question whether these findings, which show the importance of very small knowledge firms on the supply side of the new economy, can be generalised.

8. How Important is Establisment Size?

In the previous two chapters, we have tried to assess the peculiarities of SMEs in the new economy by comparing three establishment size categories on a whole range of eWork and eSupply-related variables. In some instances, the number of employees made a really significant difference; in other cases, its impact was rather limited, or even completely negligible. The size of an establishment is clearly not the only factor impacting on eWork and eSupply practices. In this chapter, we introduce other potentially influential factors, such as the country and the economic sector under investigation, and compare their impact to that of establishment size. Once again, we focus firstly on eWork and the demand for information activities, and secondly on the supply side of the trade in information activities.

8.1 eWork: comparing establishment size to other influencing variables

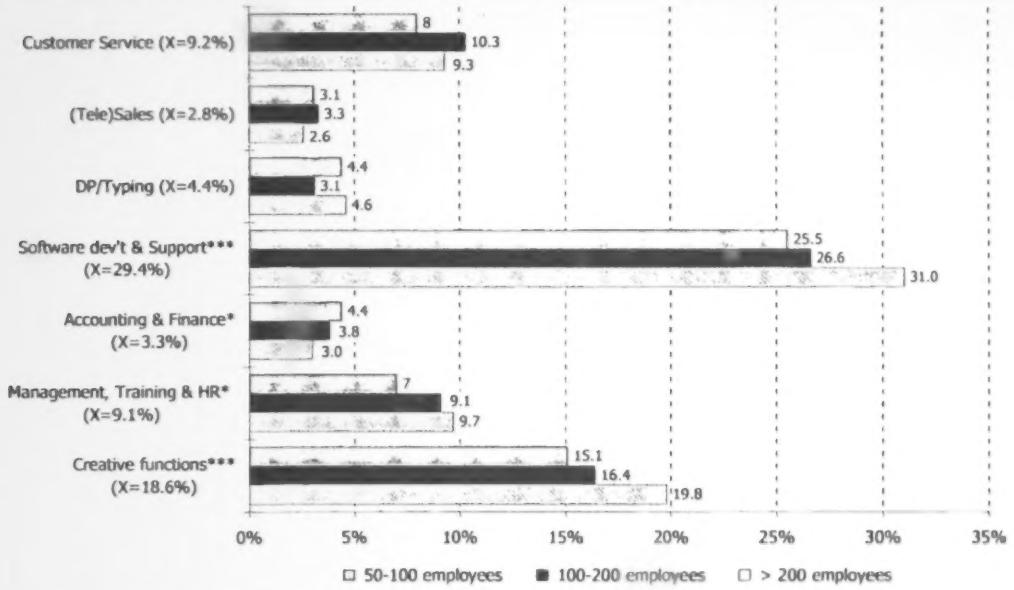
8.1.1 eWork by business function and size

The seven generic business functions distinguished in the EMERGENCE survey have already been discussed on the supply side of the trade in business services (*cf.* section 7.3) because we had a specific hypothesis to test (hypothesis 10). In this paragraph, we take a complementary look on the demand side of eWork.

Figure 8.1 shows that, regardless of the size of an establishment, software development and support, is the function most likely to be carried out remotely using a telecom link. The second most common telemediated function, for all establishments, is 'creative work', a category which includes design, editorial work, multimedia content generation and other creative activities such as R & D.[1] Creative work is followed either by customer service, or

[1] The very high levels of demand for IT services and creative work are not mirrored by an equally high degree of eSupply of these business functions (*cf.* Figure 7.5). At least two factors might contribute to this: the strength of countries outside Europe (which are not sampled in this survey) in the supply of software development and creative work; and the existence of number of micro-businesses, either single freelancers or companies with fewer than 50 employees, which,

Figure 8.1: eWork by function and size (% of all establishments)[1]



Source: EMERGENCE European Employer Survey 2000 (n = 7,305). Weighted figures.

by management and HR, and at a larger distance, the remaining three business functions. In other words, we find more or less the same ranking for the three size categories. This observation points to the generic business function having a larger impact on the frequency of eWork than the size category under study.

When looking at the seven generic business functions separately, the general pattern of the frequency of eWork straightforwardly increasing with the size of an establishment, is only repeated for software development and support, creative work, and, to a lesser extent, management and HR. The frequency of observing eWork for these three business functions is significantly higher in larger establishments. For customer service, sales and data processing, we cannot find a clear relationship between size and the possibility of eWork. Finally, for accounting and finance activities, there is a significant relationship, albeit the other way around:

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because of their size, are not picked up in our survey either. The first two supplementary micro-business surveys (in Ireland and Denmark) seem to give support to this latter assumption, *ie* that a lot of micro-firms in the knowledge sector specialise in the remote supply of software development and creative activities (*cf.* Appendix 4, Figures A4.1 and A4.2).

[1] Figure 8.1 presents data for the aggregate variable eWork only; analogous data for eOutsourcing and eEmployees separately (frequencies by business function and size) can be found in Appendix 4, Figures A4.3 and A4.4.

smaller establishments are more likely to practise eWork for this business function than their larger counterparts. The higher eWork-score on accounting and finance can be explained fully by a higher degree of outsourcing by smaller companies (*cf.* Appendix 4, Figures A4.3 and A4.4). This may be a reflection of a lack of expertise, or insufficient demand to make it economic to have a permanent in-house solution.

8.1.2 eWork by country and size

In general, countries with high levels of eWork fall into two broad categories: advanced high-tech economies such as Sweden, Finland and the Netherlands, which make use of modern information and communication technologies for a wide variety of eWork practices; and countries in Southern, Central, and Eastern Europe such as Italy, Spain, Hungary, Poland and the Czech Republic, which have very high levels of outsourcing, sometimes rooted in economic systems which favour small firms, or with a large informal economy (Huws and O'Regan, 2001). These authors conclude that 'the new information technologies have clearly enabled establishments in these countries to develop electronically-enabled subcontracting networks to a considerable extent' (*ibid.*, p. 18).

We now elaborate a little further on size-related differences within individual countries. Figure 8.2 therefore, shows the frequency of eWork by size and country, the countries being ordered according to their average score on the aggregate variable eWork.[1]

The average European pattern of the frequency of eWork increasing with the size of an establishment can hardly be observed when looking at individual countries. On the other hand, in almost all countries, the frequency of eWork is higher in large (>200 employees) than in small establishments (50 to 100 employees).

The empirical data also show that countries with high eWork scores, especially the Scandinavian and Eastern-European ones, are doing well in all their size categories. On the other hand, countries practising eWork less often, such as France and Portugal, have low scores for all three size categories. To give an example, the lowest eWork percentage in Finland (66.7 per cent) is still more than twice as high as the highest one in France (31.6 per cent).

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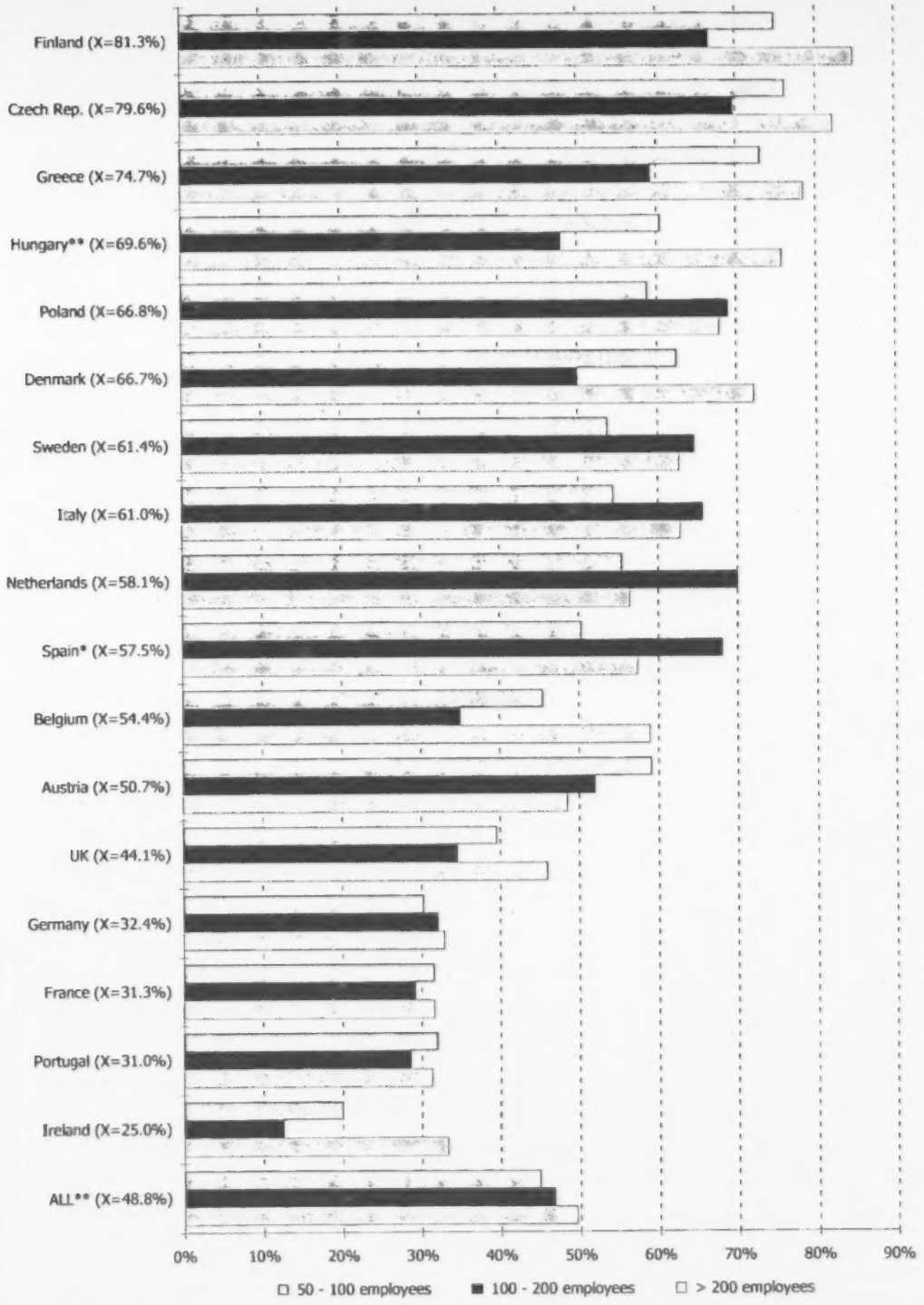
[1] Figure 8.2 presents data for the aggregate variable eWork only; analogous data for eOutsourcing and eEmployees separately (frequencies by country and size) can be found in Appendix 4, Figures A4.5 and A4.6. Luxembourg has not been included in this Figure because the amount of observations is too small to allow for a meaningful breakdown according to the number of employees. On the other hand, the data from Luxembourg are included in the summarizing variable 'ALL'.

Figure 8.2: eWork by country and size (% eWork)



Source: EMERGENCE European Employer Survey 2000 (n = 7,305). Weighted figures.

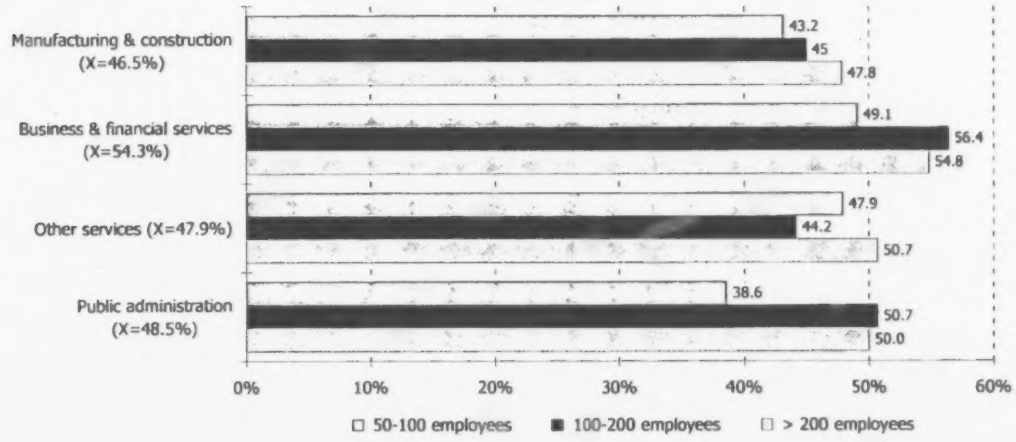
In brief, on the basis of the data shown in Figure 8.2, we can say that size does not impact on the frequency of eWork as much as country. Rather than suggesting a common European model of eWork practice, the empirical data gathered in the project reveal a considerable degree of national and regional diversity within Europe. We now elaborate a little further on the impact of the economic sector.

8.1.3 eWork by sector and size

In Chapter 6, we made a distinction between establishments belonging to the so-called knowledge sector, and other establishments. It became clear that establishments in the knowledge sector use eWork more often than establishments belonging to other sectors. They do not outsource information work to third party companies more often, but they make far more use of eLancers and all types of eEmployees. In this paragraph, we present another sector breakdown and compare the use of eWork in four major economic sectors: manufacturing and construction, business and financial services, other services and public administration.

In general, the economic sector has a very significant impact on the frequency of eWork.[2] As can be seen in Figure 8.3, we find the largest amount of eWork activity in the business and financial

Figure 8.3: eWork by sector and size (% of all establishments)[1]



Source: EMERGENCE European Employer Survey 2000 (n = 7,305). Weighted figures.

[1] Figure 8.3 presents data for the aggregate variable eWork only; analogous data for eOutsourcing and eEmployees separately (frequencies by sector and size) can be found in Appendix 4, Figures A4.7 and A4.8.

[2] A χ^2 - test of cross-tabulating eWork by sector yielded a p-value of 0.000, which points to a very significant relationship.

services sector. This is to be expected, given the high information content and advanced use of ICTs in these sectors. There is little to differentiate the remaining three sectors, but establishments in manufacturing and construction practice eWork least often of all the sectors. Establishments in the public sector score particularly weakly in the field of employing eEmployees (*cf.* Appendix 4, Figures A4.7 and A4.8). This may reflect some managerial conservatism in a sector still dominated by often hierarchical bureaucracies.

Figure 8.3 also shows that the general pattern of the frequency of eWork increasing with the size of establishments, can only be observed in manufacturing and construction. On the other hand, in all sectors, large establishments practice eWork more often than small ones. The difference between small and large establishments appears to be especially striking in the public sector. Only 38.6 per cent of the small establishments in public administration practice a form of eWork, which is the lowest percentage of all 'sector by size' combinations. The highest percentages can be found in medium-sized and large establishments in the business and financial services sector.

8.1.4 Comparing the impact of size, sector and country

The analyses presented so far have focused on a number of 'bivariate' relationships between eWork and establishment characteristics, such as the number of employees, the economic sector and the country (showing, for example, that eWork is more likely to be practised in large establishments, in the business and finance related sectors, in establishments belonging to the knowledge sector and that the countries from Scandinavia, Southern, Central and Eastern Europe have rates of establishment level eWork that are above the European average). It is not possible through this analysis, however, to separate out the interrelated effects of the size, sector[1] and country variables.

The analysis of each separate effect on the propensity of an establishment to practice eWork, while controlling for the effects of all the other factors, requires the use of logistic regression modelling. A full explanation of how these models can be interpreted is presented in Appendix 5. In summary, however, we make the following conclusions:

In general: The country, economic sector and size of an establishment each have a separate, significant effect on the

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1 We have decided to include two sector-related variables in the analysis – the economic sector (with the categories manufacturing and construction, business and financial services, other services and public administration) and whether an establishment belongs to the so-called knowledge sector (as defined in Appendix 1) or to other sectors.

propensity of an establishment to practice eWork. When controlling for the effect of these explanatory variables, the question whether an establishment belongs to the knowledge sector does not impact significantly on the likelihood of observing any eWork. We now have a further look at the explanatory variables which have a separate effect.

Country: Using Austria (our proxy-variable for the European average) as a reference category, the Czech Republic, Hungary, Poland, Finland, Sweden, Greece and Italy have a higher propensity to practice eWork, while France, Germany, Ireland and Portugal have a lower propensity.

Economic sector: Using public administration as a comparison group, establishments belonging to the business and financial services sector have a higher propensity to practice eWork.

Establishment size: Using large establishments (>200 employees) as a comparison group, establishments employing 50 to 100 employees are less likely to practice eWork. Medium-sized establishments (100 to 200 employees) do not differ significantly from large ones.

In addition to modelling the overall variable 'any eWork', we have run logistic regression models for the concrete types of eWork distinguished in EMERGENCE, *ie* the use of home-based teleworkers, mobile teleworkers, employees in remote back offices or telecottages, eOutsourcing to companies and eOutourcing to freelancers (*cf.* Appendix 5, Tables A5.2 to A5.7). This exercise generated the following results.

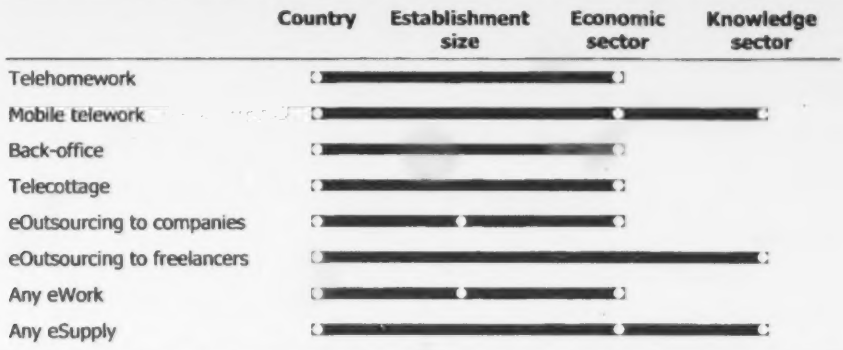
Even when controlling for sector and size, the country variable has a very significant impact on all forms of eWork, be it in-house or outsourced eWork, be it individualised eWork or information work on shared office premises.

When controlling for sector and country, establishment size only has a significant effect on the likelihood of conducting eOutsourcing to companies. To be specific, small establishments (50 to 100 employees) are less likely to outsource information work to third-party companies than their counterparts employing more than 200 employees. Small and medium-sized establishments are less likely to use eLancers too, but this result was marginally insignificant. There is no clear relationship between establishment size and the four types of in-house eWork.

The economic sector has a separate impact on all different types of eWork, except for the use of eLancers. Establishments in the knowledge sector have a higher propensity to conduct multi-locational eWork and to make use of eLancers.

In general, the separate effect of establishment size on the likelihood of practising concrete forms of eWork appears to be

Table 8.1: The separate effect of country, sector and size on different types of eWork and eSupply: significant effects at the 5% level after logistic regression modelling



Source: EMERGENCE European Employer Survey 2000 (n = 7,305). Weighted figures.

considerably smaller than the effect of sector, which, in turn, is smaller than the effect of the country variable. This can also be derived from Table 8.1. The last line of this table makes a perfect stepping stone to the next subject, *ie* the supply side of the trade in information services.

8.2 eSupply: comparing establishment size to other influencing variables

8.2.1 eSupply by country and size

Once again, as can be seen from Figure 8.4, we find major national differences in the supply of eServices. The very high levels of eSupply in Poland, Hungary and the Czech Republic mirror the high levels of eWork demand for the same services in those countries.[1] Within the EU, the Scandinavian countries and the Netherlands have the highest proportion of establishments supplying information work using the new technologies. This reflects the well-developed technological base and strong information service sectors of these countries. It might be expected that the supply of eServices would also be above average in Spain, Italy and Greece, where the demand for these services is well above average too. Surprisingly, however, this is not the case. On the contrary, the proportion of firms found supplying eServices was significantly below average in these countries. According to Huws and O'Regan (2001), the most likely explanation for this observation is that establishments in these countries buy in a lot of services from micro-businesses, that are too small to be included in the survey. Supplementary surveys of very small firms in these countries will shed further light on this issue.

[1] For a more detailed discussion of eWork practice in the Central and Eastern European countries, we refer to the EMERGENCE report on EU candidate countries.

After this general elaboration on national differences in the field of eSupply, Figure 8.4 below gives an additional size breakdown within individual countries, which are ordered according to their average score on the aggregate variable eSupply.

In some countries, the frequency of eSupply increases with increasing numbers of employees (*eg* Finland and Sweden). In other countries, we find an opposite relationship: the smaller the establishments, the higher the percentage of eSupply (*eg* Czech Republic and Ireland). In most countries, though, there is no clear relationship between the number of employees and the supply of telemediated services, which is in line with the general picture at the European level ('ALL').[1]

In brief, when compared with the size variable, the country variable has a far more important influence on the frequency of supplying telemediated services. This supply is not only subject to considerable country differences; the economic sector under study also exerts a very significant impact.

8.2.2 eSupply by sector and size

Not surprisingly, we find the largest proportion of establishments supplying information services to third party companies, in the business and financial services sector. The 'other services' sector occupies the second position, whereas establishments belonging to the public administration are clearly lagging behind other sectors in the field of eSupply. This can be derived from the left-hand column of Figure 8.5. This Figure also presents a breakdown of sectoral eSupply by the number of employees.

In line with the demand for eWork (*cf.* Figure 8.3), the highest proportion of eSupply can be found in medium-sized establishments in the business and financial services sector. In comparison, medium-sized establishments in public administration offer telemediated services almost four times less frequently (nine per cent versus 33.8 per cent).

In general, though, the number of employees does not significantly impact on the frequency of eSupply within individual sectors. In all four sectors, the number of small (50 to 100 employees) establishments offering eServices does not differ very much from the number of large establishments doing so.

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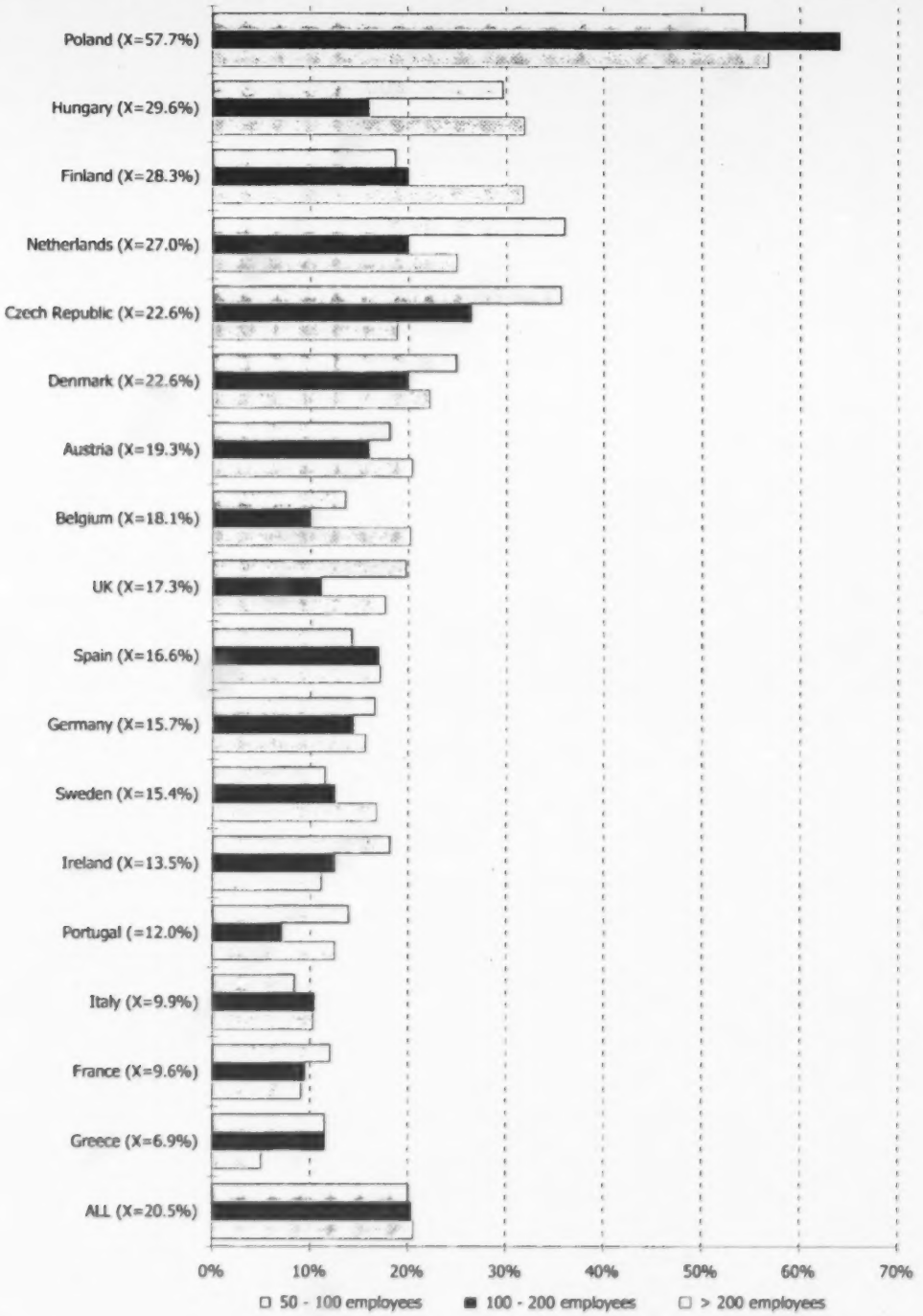
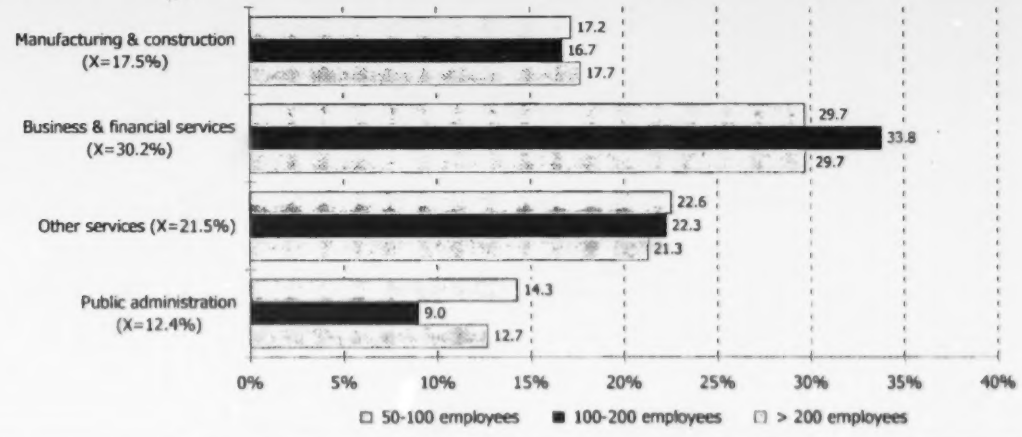
[1] It would have been very interesting to present an additional country by size breakdown in the knowledge sector only, where the number of employees does have a straightforward and significant impact on eSupply (*cf.* Figure 7.3). Unfortunately, the number of observations in each cell becomes too small to do this analysis in a statistically reliable way.

Figure 8.4: eSupply by size and country (% of all establishments)



Source: EMERGENCE European Employer Survey 2000 (n = 7,305). Weighted figures. Note: Luxembourg is not presented because the amount of observations is too small to allow for a meaningful breakdown according to the establishment size. On the other hand, the data from Luxembourg are included in the summarizing variable 'ALL'.

Figure 8.5: eSupply by sector and size (% of all establishments)



Source: EMERGENCE European Employer Survey 2000 (n = 7,305). Weighted figures.

8.2.3 Comparing the impact of size, sector and country

The analyses presented so far have focused on a number of bivariate relationships between eSupply and key establishment characteristics (showing, for example, that small establishments are not lagging behind large ones in the field of eSupply, that establishments in business and finance related sectors or belonging to the knowledge sector supply eWork most often, and that the CEE countries, Scandinavia and the Netherlands have rates of establishment level eSupply that are above the European average). In line with the demand side of eWork, we have tried to assess the separate effect of country, sector and size on the propensity of an establishment to supply eWork, while controlling for the effects of all the other factors. The output of this logistic regression analysis can be found in Appendix 5, Table A5.8. In summary, we make the following conclusions.

In general: The variables country and sector (economic sector and knowledge sector) have a separate, very significant, effect on the propensity of an establishment to supply eWork, but this is not the case for establishment size. We now look at the four explanatory variables separately.

Country: Using Austria (proxy-variable for the European average) as a comparison group, Poland and Hungary have a higher propensity to supply eWork, while Greece, France and Italy have a lower propensity.

Economic sector: Using public administration as a comparison group, all other establishments are more likely to supply eWork.

Knowledge sector: Establishments in the knowledge sector have a higher propensity to supply eWork than their counterparts belonging to other sectors.

Establishment size: When controlling for the effect of all other explanatory variables, small and medium-sized establishments (<200 employees) do not differ significantly from large ones (>200 employees) in the field of eSupply.

8.3 How important is establishment size? Concluding remarks

The number of employees is clearly not the only factor impacting on the frequency of observing different types of eWork and eSupply. Bivariate analyses reveal considerable country and sector differences. Moreover, they seem to suggest that the influence of establishment size is smaller than that of sector and country. This assumption is confirmed by logistic regression analysis, which separates out the interrelated effects of the explanatory variables (country, sector and size). Logistic regression does indeed show that the impact of establishment size on different types of eWork and on eSupply is subordinate to the impact of sector, and certainly to the impact of country. Several factors might contribute to this.

Firstly, the observation that the number of employees does not differentiate eWork and eSupply practices as much as sector and country, is likely to be influenced by that fact that very small firms have been excluded from the survey. Supplementary surveys in very small firms will allow us to determine whether the finding can be generalised to all establishments or not.

Secondly, rather than suggesting a common European model of eWork practice, the empirical data gathered in the EMERGENCE survey reveal a considerable degree of national and regional diversity within Europe. This is certainly not an isolated observation. Other international employer surveys, for example, Schienstock *et al.* (1999a) support the idea of regional diversity instead of regional convergence within the European information society. In fact, the observation of very significant country differences within Europe is also in line with the global statistical analysis conducted at the beginning of the EMERGENCE project. An exhaustive analysis of existing statistical indicators at a global level was used to construct an eIndicators database, including 204 countries and 171 variables. A cluster analysis of these data resulted in the identification of six broad clusters of countries – eLeaders, eCapables, eHares, eTigers, eMaybes and eLosers – full details of which can be found in Huws, Jagger and Bates (2001). The fact that we find examples of each of the six clusters in the small subset of 18 European countries present in the employer survey, underlines the very high degree of national diversity

within Europe; a diversity that clearly outweighs the difference between SMEs and large establishments as operationalised in the EMERGENCE project.

A final factor has already been touched on elsewhere in this report, and refers to the enormous heterogeneity of the group of SMEs. Irrespective of the sector or economic activity, SMEs can, among others, consist of startup companies, freelancers creating a micro-firm, subsidiaries of large companies, small companies that are likely to remain SMEs for ever, rapidly growing companies that are likely to exceed the 'SME-threshold' in due course, formerly large companies that have become SMEs after downsizing, formerly large companies that have become SMEs after outsourcing and/or splitting up the company into different independent entities, former units of larger companies that have been made independent or privatised, *etc.* eWork practices are likely to differ according to the type of SME, but a lot of these differences bear the risk of being averaged out when grouping this enormous variety under one common denominator.

In line with this idea of heterogeneity, the EMERGENCE case studies in which SMEs are involved show a rich variety of different eWork and relocation practices. The next chapter, Chapter 9, presents some qualitative information from the case studies illustrating the variety of roles SMEs take up in relocation processes and the trade in information activities. Finally, Chapter 10 presents some overall conclusions concerning the threats and opportunities for SMEs in the new economy.

9. Illustrative Case Study Fragments

In addition to the overall EMERGENCE survey and supplementary micro-firm surveys, 62 in-depth company case studies were conducted in 2001. The case studies were designed to capture the dynamics of employment relocation in 'source' areas, from which certain kinds of information-processing work may be migrating, or from which they are managed, and 'destination' areas, which are currently attracting this type of employment. The very large differences in the take-up of eWork cannot be explained simply in terms of technological and economic factors; social, cultural and organisational factors also play a critical role and these can only be grasped and understood by qualitative research that takes a closer look at individual relocations. Whereas the forms of work delocalisation investigated in the survey encompass individualised and collective types of eWork, the qualitative empirical work within the case studies focused on work delocalisation in shared 'office' premises only, covering both (internal and outsourced) contractual possibilities.

For a detailed discussion of the qualitative empirical work within the case studies, we refer to the EMERGENCE case study report (Flecker and Kirschenhofer, 2002). In this chapter, we limit ourselves to presenting some short case study fragments in which SMEs are involved.

Because the survey made us conclude that SMEs are more important on the supply side of the trade in information activities than on the demand side, we start off by giving some concrete example of SMEs supplying different kinds of remote information-based business services using the new technologies. The first examples deal with the supply of, respectively, software development and customer service, two business functions commonly outsourced to subcontractors using the new technologies.

SMEs supplying software development or support to remote third-party companies

Compass is a very small company (16 employees) born from a university-industry alliance. The company develops websites, touch screen systems, electronic publications and other forms of 'advanced software experience'. The company supplies bespoke solutions to a

variety of clients, particularly galleries, museums and charities from other regions in the UK, and from around the world.

The case study focuses on a metropolitan museum outsourcing the development work of a multimedia guide through the museum. The motive for the outsourcing arose from the fact that the necessary specialised knowledge was not available internally, and, because of the one-off nature of the project, it was not to be established. The multimedia company Compass was chosen on the basis of its skills; its location did not play a role. It would certainly have been possible to find a contractor for the project in the city where the museum is located. This case study is an example of highly skilled staff, and reputation, attracting work from distant clients, in a way rendering geography obsolete.

Call centre SMEs specialising in the supply of remote customer service

Minicall is a very small call centre in a central European city. The centre sets up appointments with potential business customers for a telecom company selling Internet access (based in another major city of the same country). There are target quotas of a particular number of appointments to be made per week. The call centre operators are specialised in a specific technological field, namely DSL. They have to contact potential customers and explain the advantages of a DSL Internet access.

The job in question has been outsourced because the operators of the internal call centre have not been trained in new technologies, and an outsourced solution appeared to be more flexible (due to the specialisation effects of outsourced call centres in general). In the long run, the internal call centre agents might become superfluous, partly because they are only capable of handling old technology fields, and products which are becoming less important. However, for Minicall, the relationship is also characterised by uncertainty: if the market fails to be successful, the telecom company might quickly terminate the contract.

This example illustrates the uncertain employment situation call centres can face. This is all the more the case for call centres handling the 'overflow' from the contractor's internal call centre. This implies that they only cover peak demand, and that employment is less secure. In case of lower demand, the clients discontinue the contract with the call centre rather than making their own employees in internal call centres redundant. Outsourced customer service units are very vulnerable in this respect, especially the smaller ones, which are very dependent on a limited number of clients and therefore have few possibilities to spread the employment risks.

Below, we give two examples of SMEs supplying creative work and information work in the 'management, training and HR' category.

SMEs specialising in the supply of design, editorial and other creative work

The company Text employs only six people in a small town in Ireland, and provides language localisation (checking translations), editing and preparation of graphics, mainly for scientific authors. About half of the work comes from within Ireland, while the rest comes from Germany, Finland, Japan, Korea and Israel. The subject of the case study is the checking of English language translations for a Finnish company.

Translation seems to be the function that requires the least contextual information. In this area, interaction can usually be reduced to one interface. In the case of Text, the Nordic client made contact with the translation agency through their website and, after some small translations as samples, started a regular co-operation on a text-by-text basis. The jobs are mostly small (2 or 3 pages) and have to be carried out within a few days or only one day. All communication takes place via e-mail. The director of Text only met the client after the co-operation was well established.

SMEs specialising in the supply of management, training and HR

Safe is a UK based small enterprise that provides occupational health and safety management constancy services and training to all sectors in Europe and the Middle East. It employs 16 occupational health and safety trainers and three support staff. In the 1990s the company moved into the provision of support, through interactive CD applications. The growing use of ICT led to the development of a subsidiary Internet based support company 'DOT' in 2000.

The examples given so far all deal with the supply side of the trade in information activities, *ie.* SMEs supplying telemediated information activities to third party companies. However, small companies can have a clear need or demand for telemediated work for their own functioning too. The EMERGENCE case studies therefore, cover some examples of SMEs buying in information services from remote eService suppliers. They can do so for many difference reasons, *eg* to get access to cheap labour, because it is not their core activity, because they lack the expertise to organise the work themselves, because they lack the scale of demand which would make it economic to have a permanent in-house solution, because they are not attractive enough to high-qualified staff and professionals, because they cannot offer the same working conditions and wages big companies do, *etc.* Here, we give an example of a small company deciding to outsource/ relocate software development because suitably qualified experts could not be found locally.

SMEs outsourcing information work because of difficulties in recruiting qualified staff and skilled workers

Dot.com is an Austrian micro-firm specialised in web design and home page development. Besides a couple of internal employees, Dot.com

works together on a project basis with a whole range of external freelancers, mainly graphic designers. Since its foundation in the second half of the nineties, Dot.com experienced increasing problems in finding qualified IT specialists to undertake the programming work. It appears to be extremely difficult for small firms like Dot.com to win in the 'wage competition' against large companies. The best programmers simply tend to opt for bigger software firms, which can offer better wage and working conditions.

The solution to the shortage of domestic information technology workers consisted of outsourcing parts of the programming work to India. In the beginning, the amount of outsourced work was very limited, but positive experiences resulted in a rapid increase in the volume of outsourcing. The necessary capacity in India was found by searching the Internet, and the co-operation takes place solely via email: without having had any telephonic contact, let alone face-to-face interaction, the concrete tasks are sent by email to an Indian programmer and the programming code is returned in the same way. The relationship between the 'source' and 'destination' of this case study is an extremely loose one, based on mutual trust. In the beginning of the co-operation, Dot.com didn't know they were dealing with a software company employing ten programmers, rather than with a freelance IT specialist. The reason for the Indians keeping this information confidential is to be found in their experience with American clients. Many of these clients do not want to outsource their work to companies because they believe that individual freelancers in India are likely to be even cheaper than software companies. The destination company of this case study does not therefore shout this information from the rooftops.

The importance of economies of scale and technological change in the decision-making process of SME

The Benelux children's book publishers Childy, an expanding small company, entered the international market in the 90s and had to reduce its costs in order to be competitive. Familiar from book fairs with the products of Asian companies, company management decided in the mid-90s to relocate pre-press and press work to Singapore and Hong Kong, after these functions had been carried out by Benelux subcontractors since the company's foundation in the early 80s. Despite some organisational problems, the relocation is considered to have been a success.

At the end of the 90s, the situation changed again. Costs of pre-press technology had fallen sharply, and Childy's turnover was considerably higher. These conditions, and appropriate investment, made it possible to set up the pre-press stage inside the Benelux plant. There was therefore an insourcing of a function that had never previously been carried out within the company itself. At the same time, this meant a return relocation of work from southern Asia to the Benelux. Most of the printing contracts were once again placed with Benelux printers, in order to make co-ordination and quality control easier.

This example of cost-oriented geographical relocation shows that relocation does not have to be permanent. As costs are the main motive for relocation, and the main attraction of the target region,

establishments are very sensitive to changes in cost relations, in this example as a result of growing turnover and technological advances. This example clearly underlines the dynamic character of relocation processes in the field, characterised by many changes over time. In line with the dynamism observed in the Childy case study, the EMERGENCE case study report shows that the general stereotype of a one-off relocation of eWork from location A to location B, is only one of several different types within a diversified landscape of the delocalisation of eWork. We now give a more complex example of eWork relocation involving very small firms.

SMEs as brokers of information services — the case of Internet-based project outsourcing intermediaries

Intermed, a European agent for used printing presses, wanted to completely redesign its website, as an ever larger proportion of its business was taking place over the Internet. The requirements were defined and a project was put out to tender. A one-person company (in the same country) applied with the intention of having the contract actually carried out by someone else, and won the contract on the basis of its lower bid. Subsequently, this one-person company sought a suitable subcontractor through the project outsourcing agency Brighterwork, a micro-firm headquartered in London, UK. Brighterwork advertised the job requirements on the Internet, and 12 offers came in within a week. A company in a CEE country was awarded the job, having outbid a Nordic and a British company, which also made the shortlist. This company then employed programmers and web designers in western Siberia to do the job. In all, six people are employed on the sales and project management team in a city in a CEE country, and 11 further people in a development office in western Siberia.

The example shows that outsourcing and relocation can go through several stages, with the companies involved being independent of one another, and not having lasting business relations. Furthermore, the players in the company undertaking the relocation are far away from choosing a particular region. Division of labour structures and geographically dispersed working in order to exploit cost advantages and to gain access to specialist knowledge, may be the rule in this sector. Micro-firms or even individual freelancers can play an important role as brokers of information services.

The following case fragment also involves individual freelancers. It is an example of the challenges of a small startup company finding, and starting co-operation with, programmers abroad.

Freelancers or micro-businesses engaged in the supply of remote IT work

Founded in 1995 by two brothers, Web offers Internet related infrastructure and website design. Unable to recruit skilled personnel in Belgium, Web made use of a coincidental acquaintance with a Hungarian living in Belgium, to look for software companies in Hungary.

It turned out, however, that no established Hungarian company wanted to co-operate with this new and small Internet startup. Whilst looking for freelancers, Web's contact found a young IT specialist who was yet to complete his studies at university. This person, in turn, involved his friends in the business. The co-operation was very difficult, at least at the beginning. The five people working for Web in Belgium were all working from home, as there was no central office. The same went for the programmers and web designers that were hired in Hungary. In the absence of a clear division of labour, and standardised and formalised project procedures, this quite often caused problems in the information flow. This in turn resulted in severe delays in project work, particularly at the early stages of the relocation. Web had to learn some hard lessons in the areas of communication, co-operation and control over the remote activities.

This Belgian–Hungarian case study demonstrates that is not always that easy for small firms to find a clear organisational structure on which to base the remote co-operation. Furthermore, the startup company had to build up contacts, infrastructure *etc.* from scratch, and this is very different from the relocation processes of large, international companies, who are often heavily supported by parent or partner companies. In general, there appear to be enormous differences between small and large companies in the capacities and resources for relocation. Budgetary limitations can make it difficult for SMEs to arrange a deal with big destination companies, or to get access to specific expert knowledge.

On the other hand, a small scale can generate advantages too. It often makes it possible to arrange things and solve emerging problems in a very flexible and fast way, thereby saving time and money. Flexibility and adaptability are general assets of SMEs, and these virtues also pay off in the trade in information activities. Among others this is demonstrated by our case study Belindus.

SMEs offering software development through a remote back-office in a low-wage country

Another case study involved the Belgian branch of the international IT company Bio, which was confronted with a shortage of information technology workers in the local labour market in the province. Outsourcing was intended to guarantee that particular projects would be able to be carried out at all. Because of the availability of a large number of IT workers, and its reputation as a software country, relocation to India was considered. However, this relocation took place indirectly, by outsourcing to the small Belgian SME Belindus, headquartered in the same Belgium city as Bio, but operating a back office in Chennai, India. This back office provides work to 25 IT specialists working for Belgian customers only.

Belindus has an unusual management structure: an Indian manager is in charge of the Belgian part of the company (mainly client relationship, sales and marketing, [illegible]), whereas a Belgian manager runs the Indian operational subsidiary. The Belgian permanence in India is mainly aimed at improving the communication and co-

ordination with the Belgian clients and creating trust. In line with this, Belindus tries to emphasise the Western company culture, management style and organisation principles of its Indian subsidiary. The clients highly appreciate the fact that they can communicate in their own language with an expatriate who understands the Belgian context. This service, made possible by the small scale and targeting Belgian clients only, is offered by very small IT companies in India.

The case study fragments presented above give a first impression of the qualitative material gathered in the EMERGENCE case studies. Without claiming to be exhaustive at all, the fragments illustrate the variety of roles SMEs take up in the new economy, more specifically in relocation processes and the remote supply of information-based work. Furthermore, the fragments underline the dynamic character of decision-making processes, organisational restructuring and co-operation over distance – a dynamism that can never be captured by means of a standardised questionnaire. The case studies provide a deeper understanding of how relocation processes are developing in the field and changing over time.

More examples of SMEs (and larger companies) supplying or outsourcing information-based work, networking and strategically co-operating with each other, *etc.* can be found in the EMERGENCE case study report (Flecker and Kirschenhofer, 2002). In the next and final chapter, we present some overall conclusions concerning the threats and opportunities for SMEs in the new economy.

10. Summary and Conclusions

This report deals with the strengths and weaknesses of small and medium-sized enterprises in the new economy, and the trade in information-based business services such as software development, data processing and customer service. On the basis of an extended literature survey, we formulated ten hypotheses about the role of SMEs in the new economy, more specifically about the use of eWork and the supply of strategic business services using the new technologies. A focused analysis of the empirical results from the EMERGENCE project allowed us to test and fine-tune all of them. The results of this exercise have been summarised systematically at the end of Chapter 6 (eWork and the demand for information activities) and Chapter 7 (the supply side of eWork and the trade in information activities). Here, we limit ourselves to presenting some overall conclusions aimed at answering the question 'Is small is finally becoming beautiful?'

- In general, the empirical data from EMERGENCE support the idea of the knowledge sector as an important cornerstone of the new economy, characterised by a very dynamic use of eWork and trade in telemediated business services. Small knowledge establishments and micro-firms appear to be increasingly important, especially on the supply side of eWork. SMEs have clearly succeeded in capturing very important segments of the market in remote business services, especially software development and support, and creative work - a category that includes design, editorial work, multimedia content generation and other creative activities such as R & D.
- The crucial role knowledge-intensive SMEs play in the new economy has not taken us by surprise. We expected a significant part of eServices to be delivered by SMEs, mainly (1) because increased outsourcing of information activities is resulting in new business opportunities for SMEs specialising in these fields; (2) because of the low degree of capital intensity of many eBusinesses resulting in relative low startup and exploitation costs – in this way, a traditional weakness of SMEs is becoming less important in the new economy; (3) because flexibility, adaptability, speed of decision-making and innovativeness – traditional strengths of SMEs – appear to be all the more important for the supply of knowledge intensive

business services; and (4) because electronic networking and clustering allows SMEs to combine the advantages of small scale with various of the benefits of large scale.

In essence, the typical weaknesses of SMEs are becoming less important in the new economy, or they can be mitigated, for example by means of networking, whereas typical strengths can increasingly be cashed in. On the basis of a literature survey, as well as the empirical results from EMERGENCE, we can therefore conclude that 'small is finally becoming beautiful'.

- In fact, it might be better to conclude that 'small *can* finally become beautiful'. The literature survey, EMERGENCE data analysis and case studies also show that the group of companies commonly categorised as SMEs, is an extremely heterogeneous one. Whereas a minority of SMEs are indeed specialising in the supply of knowledge intensive business services, the majority are still operating in a medium to low technology environment. In line with this, small establishments practice eWork less frequently than big establishments. A lot of SMEs might not be able to cope with the technological revolution and the challenges of globalisation.

  On the one hand, a considerable number of SMEs and micro-firms have succeeded in capturing important segments of the market of remote business services, thereby taking up a valuable position in the new, globalising economy. These SMEs are often considered to be the cornerstone of the knowledge economy. Simultaneously, there is the observation that many SMEs do not work their way through the electronic highway that easily. It is therefore crucially important to gain a better insight into the barriers faced by many SMEs in making better use of the eService patrimony. If these barriers are not adequately mapped and counteracted by policy, there is a risk of further economic polarisation, in which the available government incentives benefit only a small number of economic actors.

- A second nuance relates to the relativity of the size of establishments. The number of employees is clearly not the only factor impacting on the likelihood of an establishment to practice eWork, or to be involved in the remote supply of telemediated business services. The prevalence of different types of eWork and eSupply is subject to considerable sectoral and country differences. In fact, when compared with the size variable, the economic sector has a more important influence on the prevalence of eWork and the telemediated supply of information work. This is all the more the case for the country under investigation, the most important independent variable. Rather than suggesting a common European model of eWork practice, the empirical data gathered in the project reveal a considerable degree of national and regional diversity within

Europe. In other words, there appears to be considerable sectoral and regional variance in 'the beauty of being small'.

The observation that the number of employees does not affect eWork and eSupply practices as much as sector and country, is likely to be influenced, among others, by the fact that very small firms have been excluded from the overall EMERGENCE survey. It is hoped that a supplementary, international survey, focusing on very small firms, will eventually shed further light on the strategic strengths and weaknesses of SMEs, as well as the opportunities and threats they face in the new economy.

Appendix 1: The composition of the 'knowledge sector' in NACE

Table A1: Composition of knowledge sector in NACE

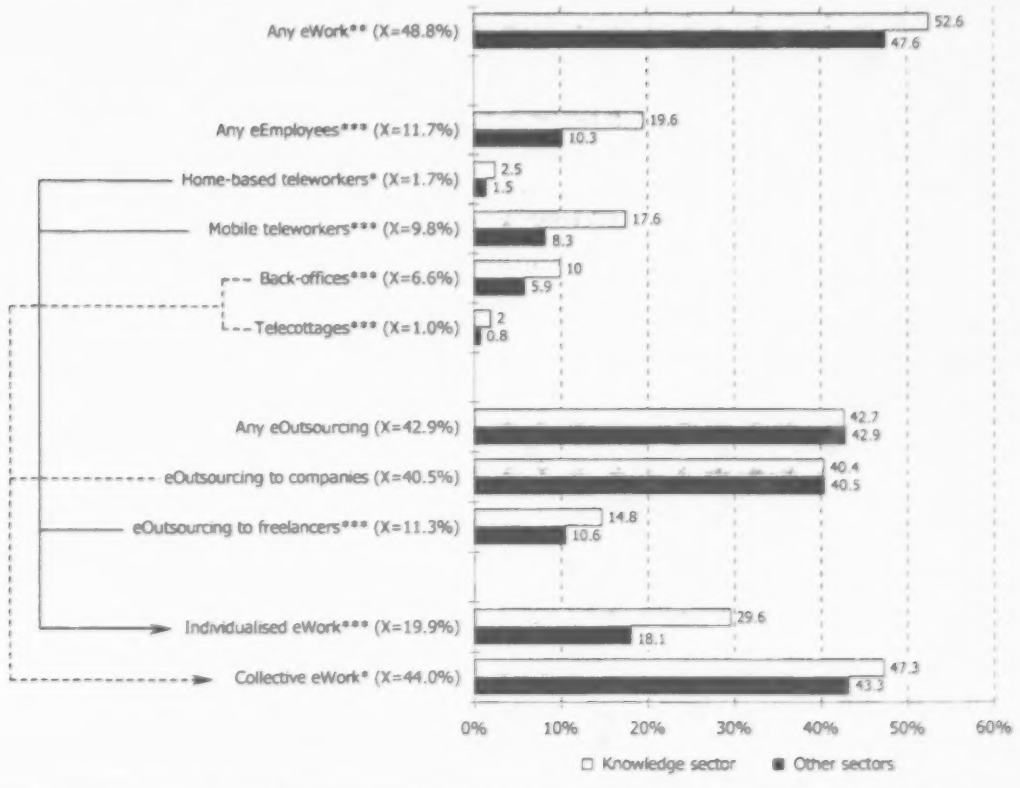
Name of sector	NACE code
Publishing, printing and reproduction of recorded media	22
Other supporting transport activities	63.2
Activities of travel agents and tour operators; tourist assistance activities n.e.c.	63.3
Insurance and pensions funding except compulsory social security	66
Activities auxiliary to financial intermediation	67
Real Estate activities on a fee or contract basis	70.3
Hardware consultancy	72.1
Software consultancy and supply	72.2
Data processing	72.3
Database activities	72.4
Other computer-related activities	72.6
Research and development	73
Accounting, book-keeping and auditing activities, tax consultancy	74.12
Market research and public opinion polling	74.13
Business and Management consultancy activities	74.14
Architectural and engineering activities	74.2
Advertising	74.4
Labour recruitment and provision of personnel	74.5
Photographic activities	74.81
Secretarial and translation activities	74.83
Other business activities n.e.c.	74.84
Adult and other education n.e.c.	80.42
Motion picture and video production	92.1
Radio and television activities	92.2
Other artistic and literary creation and interpretation	92.3

Appendix 2: eWork by type: the knowledge sector versus other sectors

Establishments in the knowledge sector practice eWork more often than establishments belonging to other sectors and, as can be derived from Figure A2.1, the difference can be explained predominantly by a higher degree of in-house eWork.

Establishments in the knowledge sector are not outsourcing more information activities to third party companies than their counterparts belonging to other sectors. Because knowledge establishments are especially important on the supply side of the trade in information activities (*cf.* Chapter 7), the average score on

Figure A2.1: eWork by type and size in the knowledge sector



Source: EMERGENCE European Employer Survey 2000 (n = 7,305). Weighted figures.

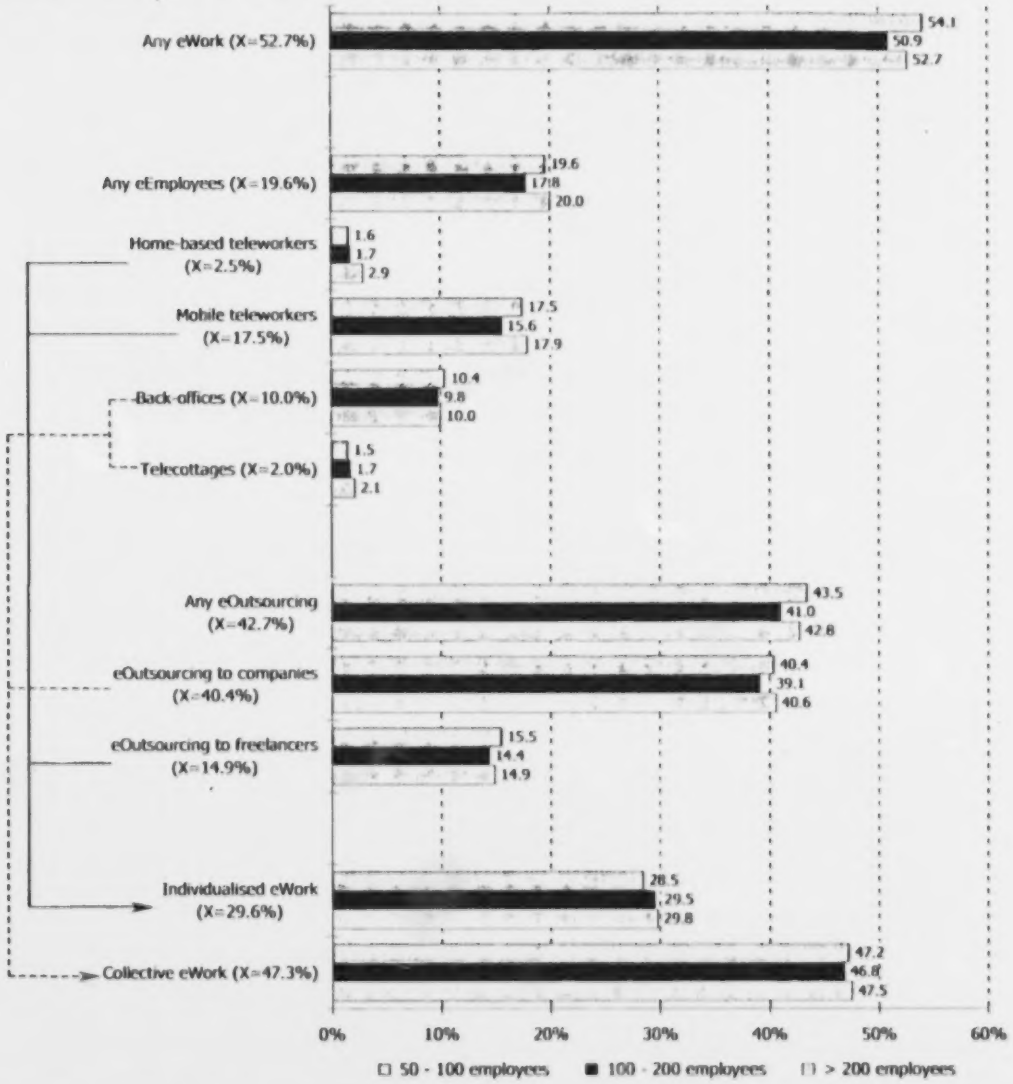
the demand side is not that surprising: knowledge establishments tend to supply eWork rather than demand it.

Whilst they are not outsourcing more information work, establishments in the knowledge sector are clearly more advanced in the field of employing eEmployees: one knowledge-establishment in five practices some form of in-house eWork. This is twice as much as establishments from other sectors. The high degree of in-house eWork is likely to be related to the nature of the work in knowledge sector. Furthermore, whereas establishments not belonging to the knowledge sector often have to make additional investments in order to introduce remote eWork, knowledge establishments might already dispose of the necessary technological infrastructure as part of their core activity.

Establishments in the knowledge sector score significantly higher on all four types of in-house eWork, and they also do so for making use of the services of eLancers. In combination with making more frequent use of home-based and mobile teleworkers, this latter observation results in a particularly high score on individualised eWork in the knowledge sector (ca. 30 per cent). The next Figure (A2.2) gives a further size breakdown for establishments belonging to the knowledge sector only.

At the beginning of Chapter 6, we concluded that in the knowledge sector, the number of employees does not have a significant impact on the frequency of the aggregate variable 'any eWork' (= hypothesis 2). On the basis of Figure A2.2, we can say that size does not impact that much on any type of eWork in the knowledge sector, be it eWork carried out internally or outsourced, be it eWork carried out by groups of workers on shared premises or by individuals acting in isolation from office premises. At least, this is the case when establishments employ over 50 employees. For a discussion of Irish and Danish knowledge establishments employing less than 50 employees, we refer to section 6.3.

Figure A2.2: eWork by type and size in the knowledge sector



Source: EMERGENCE European Employer Survey 2000 (n = 7,305). Weighted figures.

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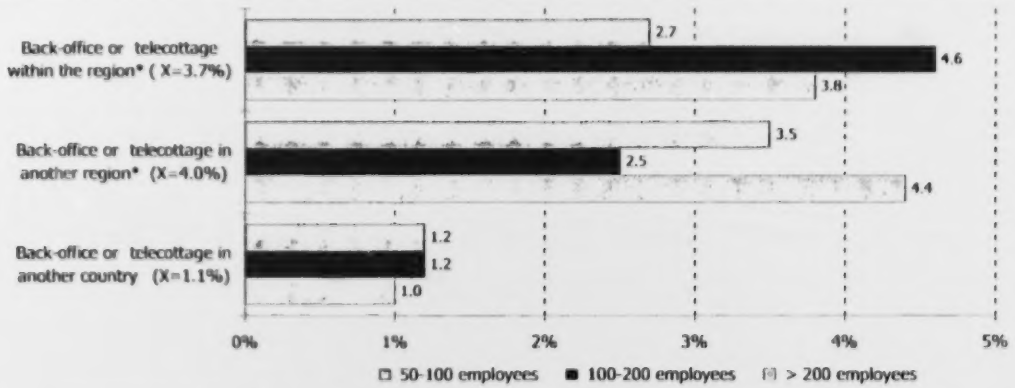
Appendix 3: The geographical scope of back offices and telecottages, and 'any remote eWork'

eWork and the delocalisation of information activities cannot only take place by means of outsourcing, but also via in-house solutions. A full assessment of hypothesis 6 therefore, requires investigating the geographical scope of the various forms of eWork carried out by the establishment's own employees. The exact location of all home-based and mobile teleworkers is impossible to assess, but additional questions have been asked as to the concrete location of back offices and telecottages. The combined results are presented in Figure A3.1.

As opposed to the group of eService suppliers, most back offices and telecottages are to be found in another region within the same country: four per cent of the European establishments have employees in another region. This category is followed, at short distance, by the own region (at 3.7 per cent) whereas very few establishments make use of a back-office or telecottage in another country (only 1.1 per cent of all establishments).

Interpreting the scores of the different size categories is less easy. In general, the data do not suggest that small establishments are performing better with nearby, and poorerwith distant back offices or telecottages. On the contrary, compared to large establishments, small ones have lower scores for back-offices or telecottages within the country than for international ones.

Figure A3.1: The geographical scope of back offices and telecottages by size (% establishments)



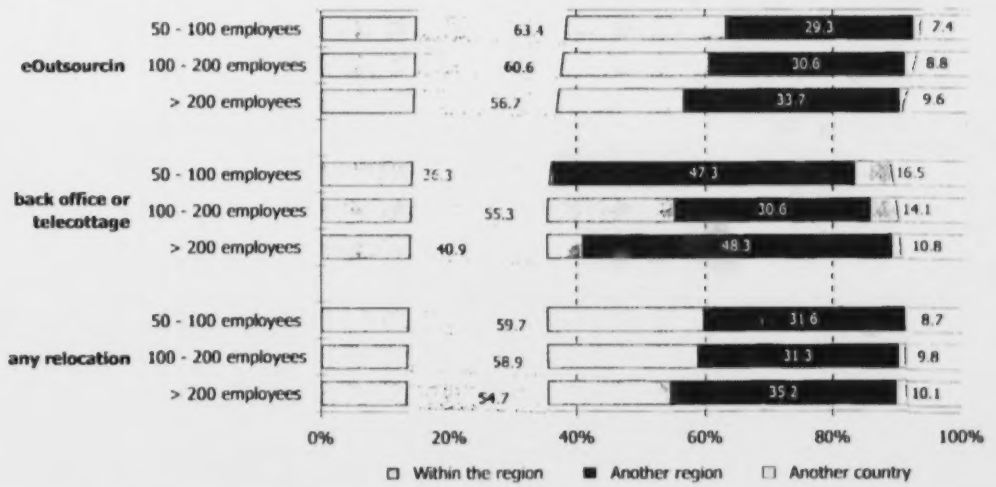
Source: EMERGENCE European Employer Survey 2000 (n = 7,305). Weighted figures.

In brief, our assumption that bigger companies more often go abroad when they are in need of information work and that smaller companies tend to prefer nearby solutions (hypothesis 6) is not valid for in-house eWork, but is valid for eOutsourcing (be it only in relative terms). This conclusion can also be derived from Figure A3.1, which presents the data in a slightly different manner. By switching the unit of analysis from the establishment to the relocations under study, Figure A3.1 makes it possible to overcome the impact of different overall frequencies in our three size categories. For example, when small establishments engage in eOutsourcing, in 63.4 per cent of the cases, the work is delivered by a company or freelancer located in the same region. In the category of big establishments, only 56.7 per cent of the eOutsourcing-instances remain within the same region. Inversely, the share of cross-border eOutsourcing-cases increases with the size of an establishment.

When turning to in-house relocations, we see a completely different picture. The observation that the share of international back offices and telecottages is highest in the smallest establishments is especially noticeable here.

Finally, eOutsourcing, back offices and telecottages have been grouped in Figure A3.2 in order to investigate the geographical dimension of any kind of relocation of information activities. This is also the purpose of Figure A3.3, which presents the percentage of establishments having relocated information work, in whatever way, within the own region, to another region of the same country and to another country.

Figure A3.2: Geographical scope of relocating information activities by size (% of relocations)



Source: EMERGENCE European Employer Survey 2000 (n = 7,305). Weighted figures.

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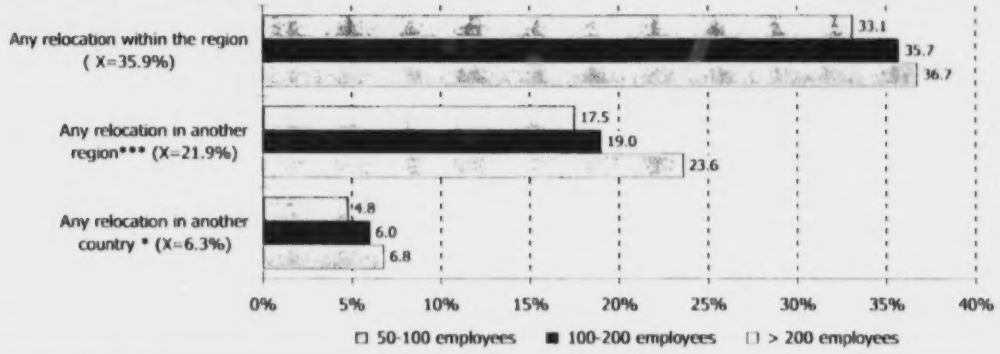
Figure A3.3: Geographical scope of relocating information activities by size (% establishments)

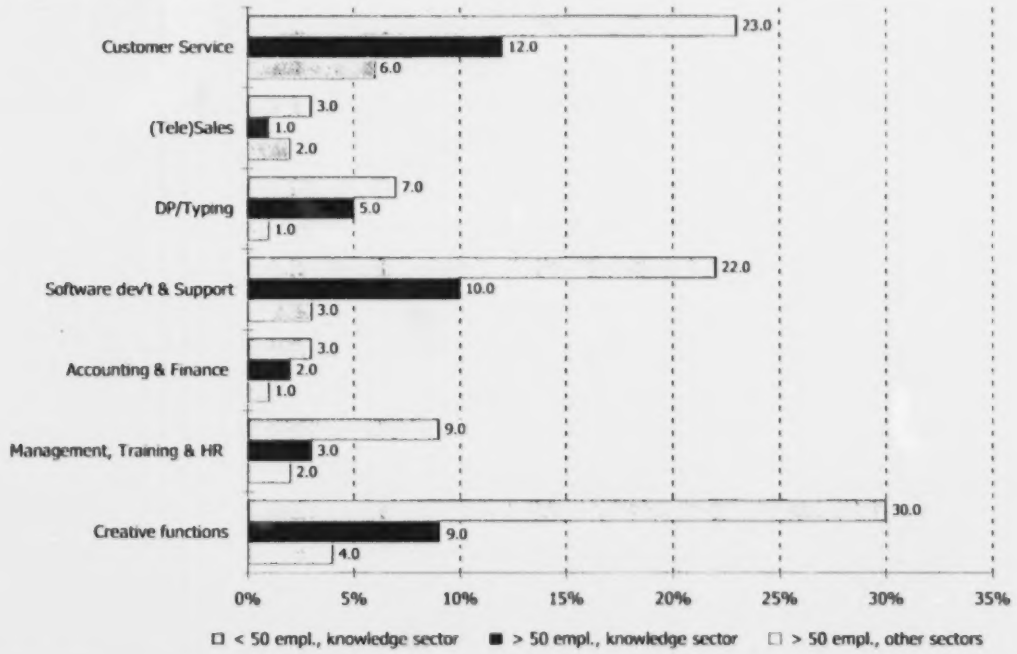


Source: EMERGENCE European Employer Survey 2000 (n = 7,305). Weighted figures.

As the majority of eWork does not involve direct employees but some form of outsourcing, Figure A3.3 resembles Figure 6.9 (the geographical scope of eOutsourcing) quite closely. The interpretation is also analogous: small establishments score significantly more weakly in the field of relocation to another region or country, but not within the own region. In relative terms, our data therefore allow us to give support to hypothesis 6, which states that 'the geographical scope of eWork is smaller in SMEs than in big companies.'

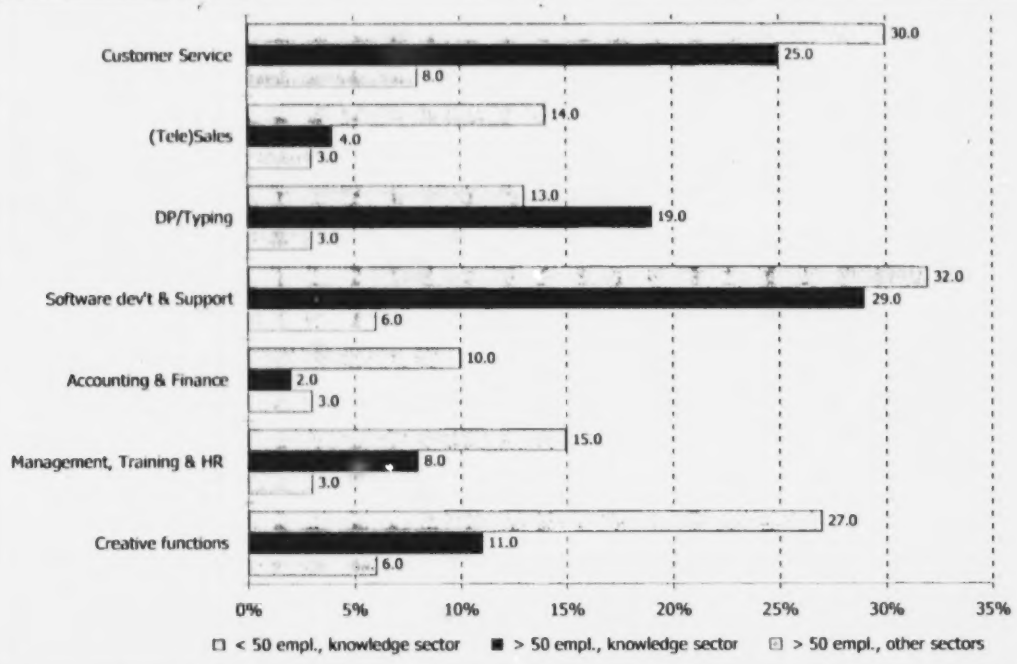
Appendix 4: Additional figures

Figure A4.1: eSupply by size and sector: the case of Ireland



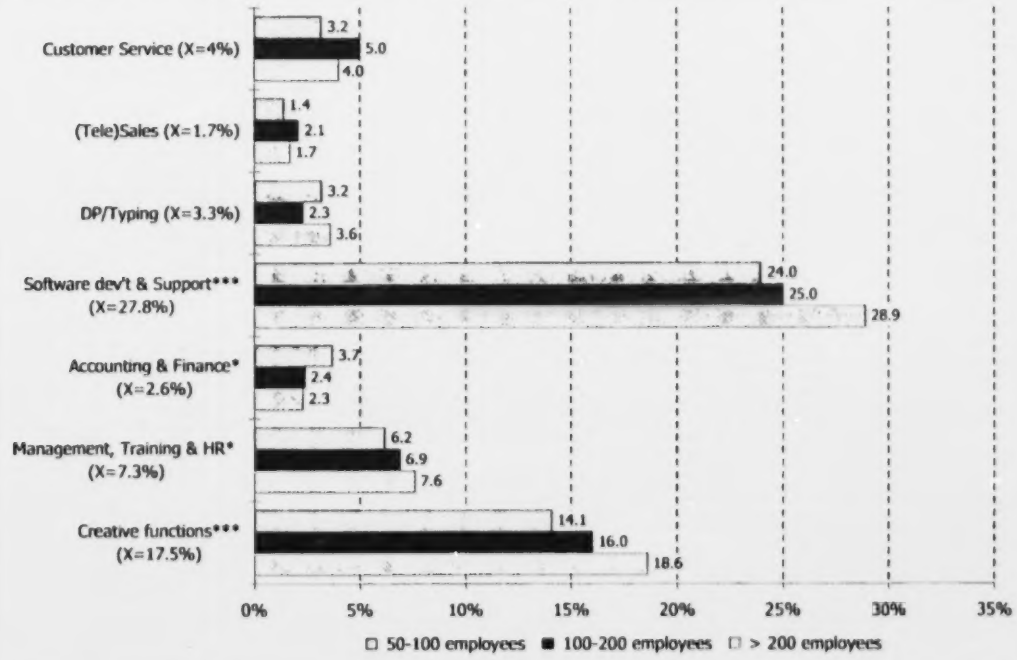
Source: EMERGENCE Irish micro-firm survey 2001 (n = 100). Weighted figures.

Figure A4.2: eSupply by size and sector: the case of Denmark



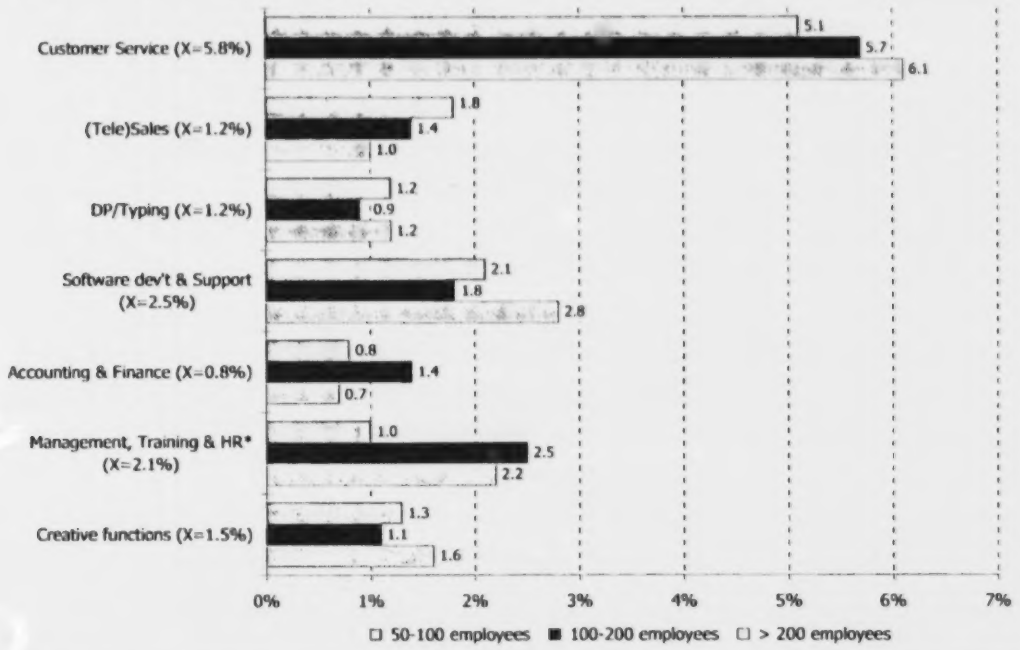
Source: EMERGENCE Danish micro-firm survey 2001 (n = 108). Weighted figures.

Figure A4.3: eOutsourcing by function and size (% of all establishments)



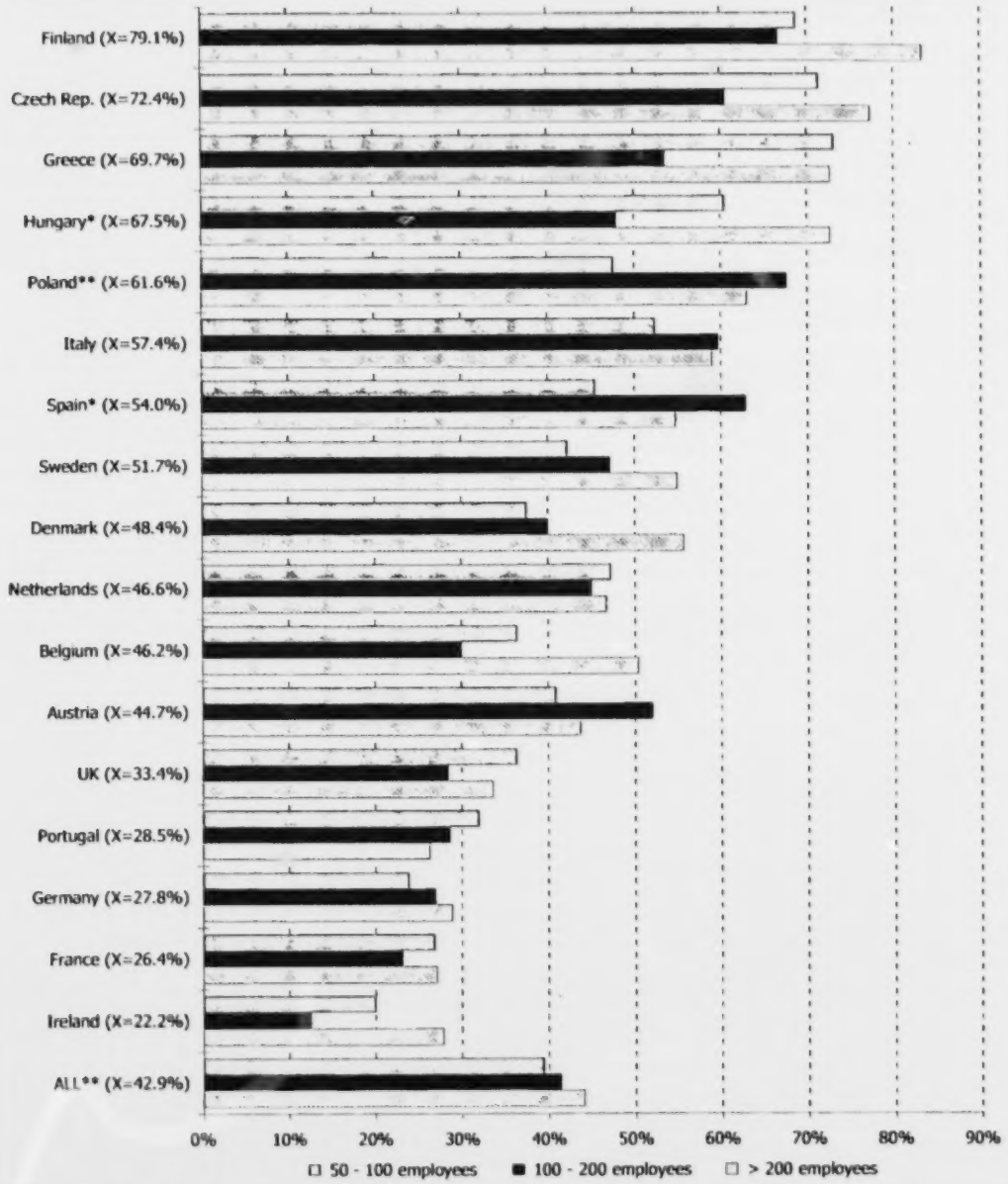
Source: EMERGENCE European Employer Survey 2000 (n = 7,305). Weighted figures.

Figure A4.4: eEmployees by function and size (% of all establishments)



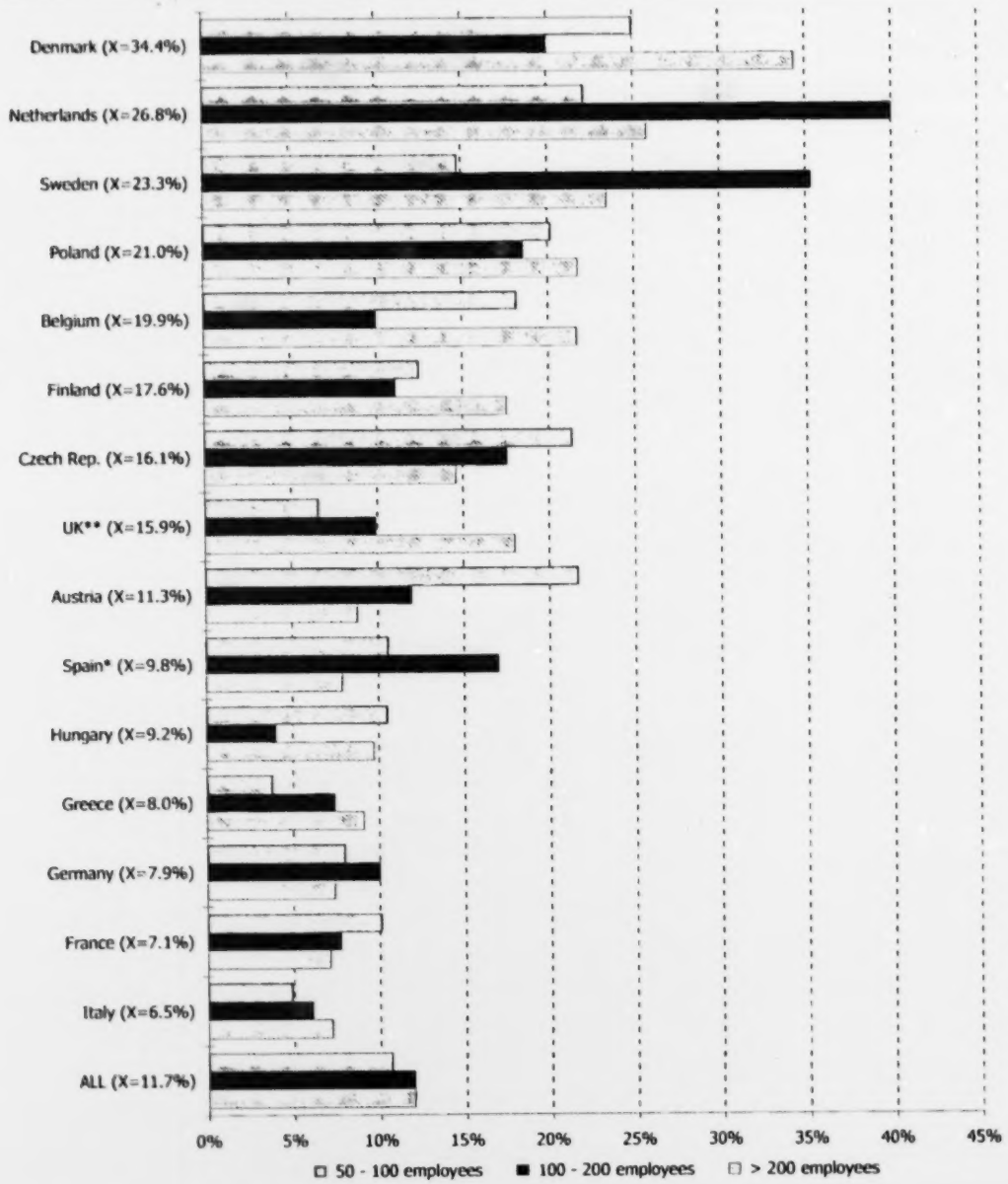
Source: EMERGENCE European Employer Survey 2000 (n = 7,305). Weighted figures.

Figure A4.5: eOutsourcing by country and size



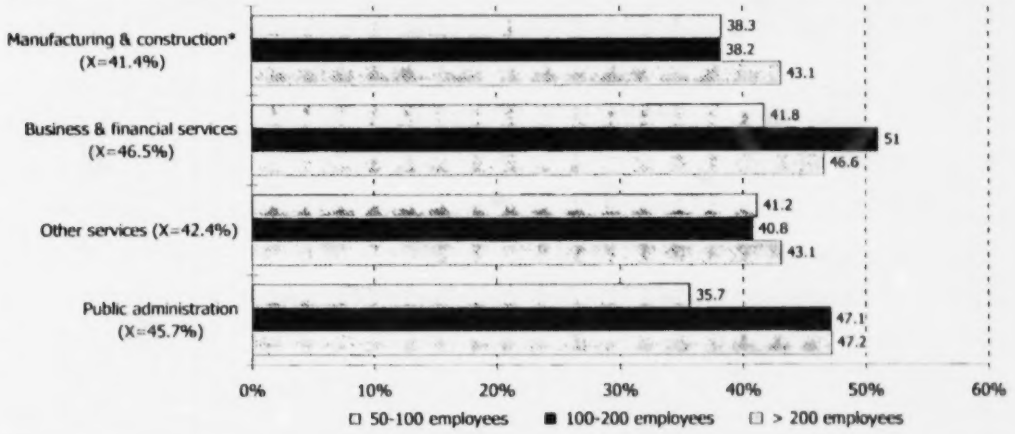
Source: Luxembourg has not been presented in this Figure because the amount of observations is too small to allow for a meaningful breakdown according to the number of employees. On the other hand, the data from Luxembourg are included in the summarizing variable 'ALL'.

Figure A4.6: eEmployees by country and size



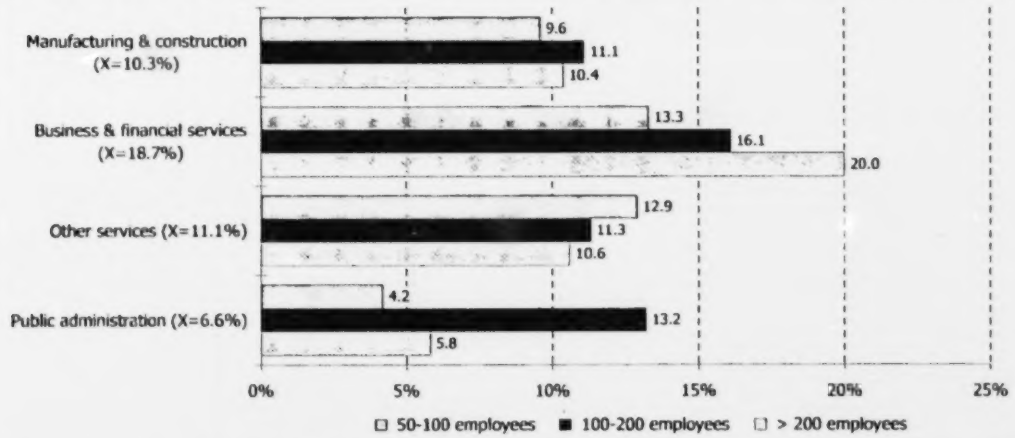
Source: Luxembourg, Ireland and Portugal have not been presented in this Figure because the amount of observations is too small to allow for a meaningful breakdown according to the establishment size. On the other hand, the data from these countries are included in the summarizing variable 'ALL'.

Figure A4.7: eOutsourcing by sector and size (% of all establishments)



Source: EMERGENCE European Employer Survey 2000 (n = 7,305). Weighted figures.

Figure A4.8: eEmployees by sector and size (% of all establishments)



Source: EMERGENCE European Employer Survey 2000 (n = 7,305). Weighted figures.

Appendix 5: Logistic models of different types of eWork and eSupply

This section presents the results of analysis of the determinants of various forms of eWork and eSupply conducted through the use of logistic regression modelling. To use this technique, we define the variable of interest (in the case of Table A5.1, whether the establishment practices any form of eWork) as being equal to 1 if true and 0 of false. The model then assesses the effects of a change in the so-called explanatory variables on the odds of an establishment practising eWork. The aim is to assess the separate effect of one explanatory variable (*eg* establishment size) on the propensity of an establishment to practice eWork, while controlling for the effects of all the other factors (*eg* country and sector). We have decided to include two sector-related variables in the analysis: the economic sector and the question whether an establishment is belonging to the so-called knowledge sector (as defined in Appendix 1) or to other sectors.

All the explanatory variables that have been used in this instance are categorical and in each case one category has to be chosen as a reference category. We have decided to include the following independent variables and respective reference categories in our logistic models:

establishment size:	>200 employees
country:	Austria (as proxy-variable for the European average[1])
economic sector:	public administration
knowledge sector:	establishments is NOT belonging to knowledge sector

As to the interpretation of the results, the last two columns in the following tables are of particular interest. The last column, 'Exp(B)' refers to the effects that a particular coefficient has,

[1] Because the score of Austria on the variables eWork, eSupply, eOutsourcing and eEmployees is approaching the European average most closely of all countries participating in the survey (*cf.* respectively Figure 8.2, Figure 8.4, Appendix 4 Figures A4.5 and A4.6), we have decided to pick Austria as the reference category for the explanatory variable country and to treat it as a kind of proxy-variable for the European average.

relative to the reference category, on the 'odds-ratio' of a particular form of eWorking being employed. A value that is greater than one suggests that the category has a positive effect on the odds ratio, while a value of less than one suggests a negative effect on the odds ratio. The statistical significance of the variable is indicated in the penultimate column 'Sig'. Commonly accepted levels of significance are the five per cent level (0.05) and the one per cent level (0.01), *ie* levels at which there is a one in twenty or one in one hundred chance that any association found was the result of chance.

Besides the effects and significance levels of each individual category relative to its reference category, the output tables also present the significance of the effect of the overall explanatory variables, while controlling for the effects of all the other factors.

So, taking 'any eWork' as an example in Table A5.1, we firstly see that the variables country, establishment size and economic sector exert a separate, significant effect on the propensity to practice eWork. The dummy variable 'knowledge sector' is not impacting separately on the odds of an establishment practising any eWork (*ie* when controlling for the effect of all other independent variables).

When comparing the categories of our explanatory variables, Table A5.1 shows that being in the Czech Republic has a positive effect, relative to Austria, on the odds of an establishment practising any form of eWork. This effect is statically significant at the one per cent significance level. This is also the case for being in Finland, Greece, Hungary and Poland. At the same level of significance (0.01), belonging to either France, Germany or Portugal has a negative effect, relative to the proxy-variable for the European average, on the odds of practising eWork. By analogy, establishments with 50 - 100 employees are less likely to practice eWork than large establishment, whereas establishments belonging to the business and financial services sector practice eWork more often than their counterparts belonging to the public administration.

Remark. Logistic regression modelling also allows to estimate the probability of finding eWork (in case of Table A5.1) for each establishment for which the explanatory variables country, size and sector are known. This can be done on the basis of the following formula:

$$P = \frac{\exp(a + b_1X_1 + b_2X_2 + \ldots)}{\exp(a + b_1X_1 + b_2X_2 + \ldots) + 1}$$

in which

P = the probability of a specified establishment to conduct eWork

$b_1, b_2, \ldots$ = the values listed in the first column of the output tables

$X_1, X_2, \ldots$ = the associated independent variables

a = the constant factor

To give two examples, the probability of finding eWork in medium-sized Finnish knowledge-establishments offering financial services, amounts up to 85 per cent:

$$P = \frac{\exp(\ 0.01 \blacksquare 1.44 \quad 0.01 \blacksquare 0.28 \blacksquare 0.09)}{\exp(\ 0.01 \blacksquare 1.44 \quad 0.01 \blacksquare 0.28 \blacksquare 0.09) \blacksquare 1} = 0.8455$$

The likelihood of a large German manufacturing establishment not belonging to the knowledge sector to conduct any eWorking is considerably lower, *ie* 32 per cent only.

$$P = \frac{\exp(-0.01 - 0.73 - 0.02)}{\exp(-0.01 - 0.73 - 0.02) \blacksquare 1} = 0.3186$$

Table A5.1: Propensity to practice any eWork

	B	S.E.	Wald	Sig.	Exp(B)
Country			717.41	0.00	
Belgium	0.17	0.23	0.54	0.46	1.18
Czech Republic	1.38	0.23	37.34	0.00	3.98
Denmark	0.58	0.41	2.06	0.15	1.79
Finland	1.44	0.31	21.42	0.00	4.23
France	-0.80	0.18	20.44	0.00	0.45
Germany	-0.73	0.17	18.12	0.00	0.48
Greece	1.08	0.24	20.40	0.00	2.95
Hungary	0.82	0.22	13.40	0.00	2.27
Ireland	-0.90	0.41	4.78	0.03	0.41
Italy	0.51	0.19	7.45	0.01	1.66
Luxembourg	-0.86	0.80	1.15	0.28	0.43
Netherlands	0.33	0.24	1.93	0.16	1.39
Poland	0.69	0.18	14.74	0.00	1.99
Portugal	-0.72	0.24	9.16	0.00	0.49
Spain	0.31	0.18	2.89	0.09	1.37
Sweden	0.51	0.24	4.51	0.03	1.66
UK	-0.26	0.18	2.08	0.15	0.77
Establishment size			10.74	0.00	
50-100 employees	-0.22	0.07	10.10	0.00	0.81
100-200 employees	-0.10	0.07	1.91	0.17	0.90
Economic sector			17.19	0.00	
Manufacturing	-0.02	0.10	0.04	0.83	0.98
Business & fin. services	0.28	0.12	5.95	0.01	1.33
Other services	0.01	0.11	0.01	0.90	1.01
Knowledge sector	0.09	0.07	1.62	0.20	1.10
Constant	-0.01	0.19	0.00	0.96	0.99

Table A5.2: Propensity to conduct telehomeworking

	B	S.E.	Wald	Sig.	Exp(B)
Country			66.84	0.00	
Belgium	0.08	0.58	0.02	0.88	1.09
Czech Republic	−1.14	0.71	2.54	0.11	0.32
Denmark	0.86	0.78	1.23	0.27	2.37
Finland	0.01	0.71	0.00	0.99	1.01
France	−1.91	0.59	10.38	0.00	0.15
Germany	−0.42	0.46	0.83	0.36	0.66
Greece	−2.28	1.34	2.88	0.09	0.10
Hungary	−1.22	0.80	2.30	0.13	0.30
Ireland	−1.67	2.25	0.55	0.46	0.19
Italy	−1.59	0.68	5.52	0.02	0.20
Luxembourg	−2.74	7.21	0.14	0.70	0.06
Netherlands	0.99	0.51	3.71	0.05	2.69
Poland	−7.93	9.03	0.77	0.38	0.00
Portugal	−3.00	2.03	2.19	0.14	0.05
Spain	−2.15	0.75	8.26	0.00	0.12
Sweden	0.02	0.63	0.00	0.98	1.02
UK	−0.15	0.48	0.10	0.75	0.86
Establishment size			4.46	0.11	
50-100 employees	−0.60	0.31	3.86	0.05	0.55
100-200 employees	−0.31	0.30	1.03	0.31	0.74
Economic sector			10.84	0.01	
Manufacturing	0.03	0.42	0.00	0.95	1.03
Business & fin. services	0.37	0.45	0.68	0.41	1.45
Other services	−0.59	0.46	1.67	0.20	0.55
Knowledge sector	0.24	0.25	0.95	0.33	1.27
Constant	−3.18	0.59	29.17	0.00	0.04

Table A5.3: Propensity to conduct mobile eWorking

	B	S.E.	Wald	Sig.	Exp(B)
Country			225.63	0.00	
Belgium	0.77	0.37	4.41	0.04	2.16
Czech Republic	0.66	0.35	3.59	0.06	1.93
Denmark	1.50	0.50	9.09	0.00	4.48
Finland	0.74	0.42	3.17	0.08	2.11
France	-0.52	0.33	2.47	0.12	0.60
Germany	-0.36	0.31	1.30	0.25	0.70
Greece	0.04	0.41	0.01	0.92	1.04
Hungary	0.17	0.38	0.19	0.66	1.18
Ireland	-0.65	0.93	0.48	0.49	0.52
Italy	-0.31	0.35	0.79	0.37	0.73
Luxembourg	-1.56	2.65	0.35	0.55	0.21
Netherlands	0.94	0.37	6.64	0.01	2.57
Poland	1.07	0.31	11.90	0.00	2.90
Portugal	-0.67	0.51	1.73	0.19	0.51
Spain	-0.04	0.34	0.01	0.91	0.96
Sweden	1.09	0.37	8.93	0.00	2.98
UK	0.58	0.32	3.36	0.07	1.78
Establishment size			0.41	0.81	
50-100 employees	-0.03	0.11	0.07	0.79	0.97
100-200 employees	-0.08	0.12	0.39	0.53	0.93
Economic sector			37.79	0.00	
Manufacturing	0.84	0.25	11.64	0.00	2.31
Business & fin. services	1.30	0.25	26.07	0.00	3.67
Other services	0.79	0.25	10.02	0.00	2.21
Knowledge sector	0.52	0.10	25.72	0.00	1.68
Constant	-3.43	0.38	81.12	0.00	0.03

Table A5.4: Propensity to have employees in remote back offices

	B	S.E.	Wald	Sig.	Exp(B)
Country			167.32	0.00	
Belgium	1.46	0.53	7.56	0.01	4.32
Czech Republic	1.47	0.51	8.19	0.00	4.33
Denmark	2.03	0.66	9.41	0.00	7.63
Finland	1.16	0.61	3.62	0.06	3.18
France	0.42	0.50	0.70	0.40	1.51
Germany	0.09	0.49	0.03	0.86	1.09
Greece	0.86	0.57	2.30	0.13	2.37
Hungary	−0.42	0.70	0.36	0.55	0.66
Ireland	−0.03	1.20	0.00	0.98	0.97
Italy	0.37	0.53	0.51	0.48	1.45
Luxembourg	−0.06	2.15	0.00	0.98	0.94
Netherlands	1.63	0.53	9.29	0.00	5.10
Poland	1.61	0.48	11.09	0.00	5.01
Portugal	0.01	0.69	0.00	0.99	1.01
Spain	0.87	0.50	3.02	0.08	2.39
Sweden	2.08	0.52	15.83	0.00	8.00
UK	1.12	0.49	5.22	0.02	3.08
Establishment size			1.01	0.60	
50-100 employees	−0.14	0.14	0.95	0.33	0.87
100-200 employees	0.01	0.14	0.01	0.93	1.01
Economic sector			33.41	0.00	
Manufacturing	0.19	0.23	0.67	0.41	1.21
Business & fin. services	0.86	0.24	12.66	0.00	2.36
Other services	0.22	0.24	0.85	0.36	1.24
Knowledge sector	0.16	0.13	1.58	0.21	1.17
Constant	−3.87	0.52	55.01	0.00	0.02

Table A5.5: Propensity to have employees in remote telecottages

	B	S.E.	Wald	Sig.	Exp(B)
Country			53.45	0.00	
Belgium	3.64	13.07	0.08	0.78	37.97
Czech Republic	6.30	12.92	0.24	0.63	547.15
Denmark	5.65	13.06	0.19	0.67	282.95
Finland	5.80	12.96	0.20	0.65	329.40
France	4.78	12.92	0.14	0.71	119.56
Germany	4.56	12.92	0.12	0.72	95.41
Greece	0.29	17.66	0.00	0.99	1.33
Hungary	6.33	12.93	0.24	0.62	563.10
Ireland	1.88	19.36	0.01	0.92	6.55
Italy	5.64	12.93	0.19	0.66	280.34
Luxembourg	4.08	14.79	0.08	0.78	59.01
Netherlands	6.59	12.93	0.26	0.61	730.07
Poland	6.93	12.92	0.29	0.59	1022.27
Portugal	4.46	13.04	0.12	0.73	86.06
Spain	5.85	12.92	0.21	0.65	348.16
Sweden	4.90	12.99	0.14	0.71	134.12
UK	4.62	12.93	0.13	0.72	101.93
Establishment size			0.31	0.86	
50-100 employees	-0.20	0.37	0.30	0.58	0.82
100-200 employees	-0.05	0.36	0.02	0.89	0.95
Economic sector			31.27	0.00	
Manufacturing	0.87	1.25	0.49	0.48	2.39
Business & fin. services	2.89	1.23	5.55	0.02	17.93
Other services	2.28	1.22	3.47	0.06	9.78
Knowledge sector	0.13	0.28	0.22	0.64	1.14
Constant	-12.26	12.97	0.89	0.34	0.00

Table A5.6: Propensity to conduct eOutsourcing to third-party companies

	B	S.E.	Wald	Sig.	Exp(B)
Country			726.57	0.00	
Belgium	0.25	0.23	1.17	0.28	1.28
Czech Republic	1.33	0.22	37.67	0.00	3.77
Denmark	0.29	0.40	0.52	0.47	1.33
Finland	1.67	0.30	31.07	0.00	5.30
France	−0.66	0.18	13.06	0.00	0.52
Germany	−0.60	0.18	11.66	0.00	0.55
Greece	1.14	0.23	24.11	0.00	3.14
Hungary	1.04	0.22	21.92	0.00	2.84
Ireland	−0.66	0.43	2.36	0.12	0.52
Italy	0.56	0.19	8.93	0.00	1.76
Luxembourg	−0.61	0.84	0.53	0.47	0.55
Netherlands	0.26	0.24	1.20	0.27	1.30
Poland	0.89	0.18	24.13	0.00	2.44
Portugal	−0.43	0.25	3.05	0.08	0.65
Spain	0.50	0.19	7.22	0.01	1.65
Sweden	0.43	0.24	3.25	0.07	1.53
UK	−0.35	0.19	3.55	0.06	0.70
Establishment size			13.76	0.00	
50-100 employees	−0.25	0.07	13.05	0.00	0.78
100-200 employees	−0.11	0.07	2.22	0.14	0.89
Economic sector			10.59	0.01	
Manufacturing	−0.13	0.10	1.55	0.21	0.88
Business & fin. services	0.12	0.12	0.98	0.32	1.12
Other services	−0.06	0.11	0.30	0.58	0.94
Knowledge sector	−0.10	0.08	1.68	0.20	0.91
Constant	−0.33	0.19	2.92	0.09	0.72

Table A5.7: Propensity to conduct eOutsourcing to freelancers (= eLancing)

	B	S.E.	Wald	Sig.	Exp(B)
Country			288.25	0.00	
Belgium	−0.36	0.35	1.02	0.31	0.70
Czech Republic	0.70	0.28	6.19	0.01	2.02
Denmark	0.05	0.57	0.01	0.93	1.05
Finland	0.68	0.35	3.90	0.05	1.98
France	−1.01	0.28	13.32	0.00	0.36
Germany	−1.06	0.26	16.13	0.00	0.35
Greece	−0.25	0.35	0.50	0.48	0.78
Hungary	0.27	0.31	0.77	0.38	1.31
Ireland	−1.56	1.03	2.29	0.13	0.21
Italy	0.75	0.26	8.26	0.00	2.12
Luxembourg	−1.62	2.16	0.56	0.45	0.20
Netherlands	0.05	0.34	0.02	0.89	1.05
Poland	0.39	0.26	2.26	0.13	1.47
Portugal	−1.38	0.50	7.70	0.01	0.25
Spain	−0.04	0.27	0.02	0.88	0.96
Sweden	0.27	0.33	0.65	0.42	1.30
UK	−0.42	0.27	2.39	0.12	0.66
Establishment size			5.35	0.07	
50-100 employees	−0.18	0.11	2.94	0.09	0.83
100-200 employees	−0.21	0.12	3.31	0.07	0.81
Economic sector			4.03	0.26	
Manufacturing	−0.01	0.16	0.00	0.95	0.99
Business & fin. services	0.07	0.18	0.16	0.69	1.07
Other services	−0.15	0.16	0.81	0.37	0.86
Knowledge sector	0.38	0.11	12.84	0.00	1.46
Constant	−1.85	0.28	42.86	0.00	0.16

Table A5.8: Propensity to supply any eWork (eSupply)

	B	S.E.	Wald	Sig.	Exp(B)
Country			749.55	0.00	
Belgium	–0.12	0.30	0.17	0.68	0.88
Czech Republic	0.24	0.26	0.85	0.36	1.27
Denmark	0.14	0.49	0.08	0.78	1.15
Finland	0.53	0.32	2.71	0.10	1.70
France	–0.82	0.24	11.77	0.00	0.44
Germany	–0.16	0.22	0.51	0.47	0.85
Greece	–1.03	0.37	7.57	0.01	0.36
Hungary	0.66	0.27	6.19	0.01	1.94
Ireland	–0.37	0.56	0.44	0.51	0.69
Italy	–0.62	0.26	5.73	0.02	0.54
Luxembourg	–0.32	1.07	0.09	0.77	0.73
Netherlands	0.40	0.29	1.92	0.17	1.49
Poland	1.82	0.23	65.52	0.00	6.18
Portugal	–0.52	0.33	2.37	0.12	0.60
Spain	–0.08	0.24	0.11	0.74	0.92
Sweden	–0.17	0.32	0.30	0.58	0.84
UK	–0.22	0.24	0.86	0.35	0.80
Establishment size			0.88	0.64	
50-100 employees	0.05	0.09	0.33	0.56	1.05
100-200 employees	–0.06	0.09	0.39	0.53	0.94
Economic sector			23.68	0.00	
Manufacturing	0.41	0.15	7.20	0.01	1.51
Business & fin. services	0.73	0.16	19.80	0.00	2.07
Other services	0.53	0.16	11.47	0.00	1.70
Knowledge sector	1.02	0.08	150.96	0.00	2.76
Constant	–2.18	0.26	70.67	0.00	0.11

Appendix 6: Methodological notes (to Chapters 6 and 7)

All figures in Chapters 6 and 7 represent differences in the use of eWork by size. The χ^2-levels of significance are included in each figure:

'***' = $p < 0.001$

'**' = $p < 0.005$

'*' = $p < 0.05$

(nothing) = not significant

Not all figures support exactly the formulated hypotheses. To test the hypotheses in these cases, we have therefore (1) added information about Irish and Danish micro-firm surveys or (2) interpreted the figures in a broad sense. The first action, including information about Irish and Danish micro-firm surveys, doesn't indicate the levels of significance in the tables because the amount of observations is too small (n = 108 for the Danish micro-firm survey and n = 100 for the Irish micro-firm survey). Results are to be interpreted with caution, and are more illustrative than really representative. The second action was needed in the cases where hypotheses are formulated in 'relative' terms (see hypotheses 3, 4, 5, 7, 8 and 10). In brief this means the following: suppose two possible statements, A and B. When we find a significant positive relation between statement A and company size, and no relation between statement B and company size, we can consequently also derive in 'relative' terms a (negative) relation between statement B and the company size.

In Chapter 6 and 7, levels of significance are only indicated for differences in the use of eWork between the three establishment size categories, and they don't refer to differences within the categories of other variables (such as the type of eWork, sector or function). The comparison of the impact of establishment size and other potentially influential factors on eWork practices are discussed in Chapter 8 (see Appendix 5: Logistic models of different types of eWork and eSupply).

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